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ABSTRACT

Contained are 25 descriptions of teacher education programs for environmental education offered by colleges and universities in the United States. These programs were identified on the basis of recommendations from specialists in the state education agencies and reflect a broad spectrum of approaches and emphases. The case studies include: (1) teacher certification programs; (2) bachelor's and master's degree programs; (3) inservice workshops; and (4) courses in environmental studies, conservation, natural history, and marine science. Several of the efforts discussed involve personnel from and student experience with public and private agencies with environment-related concerns. (Author/WB)

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ENVIRONMENTAL EDUCATION IN ACTION-IV: CASE STUDIES OF TEACHER EDUCATION PROGRAMS FOR ENVIRONMENTAL EDUCATION

Selected and Edited by
Mary Lynne Bowman
and
John F. Disinger
in cooperation with
The State Environmental Education
Coordinators Association

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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ERIC® Clearinghouse for Science, Mathematics,
and Environmental Education
The Ohio State University
College of Education
and
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1200 Chambers Road, Third Floor
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December, 1980

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ENVIRONMENTAL EDUCATION INFORMATION REPORTS

Environmental Education Information Reports are issued to analyze and summarize information related to the teaching and learning of environmental education. It is hoped that these reviews will provide information for personnel involved in development, ideas for teachers, and indications of trends in environmental education.

Your comments and suggestions for this series are invited.

John F. Disinger
Associate Director
Environmental Education

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FOREWORD

Persistent problems of American life--problems of health and disease, depletion of natural resources, land use, nutrition, pollution, population--require a massive educational input if solutions are to be reached. Our traditional college/university courses rarely direct attention to these matters. Typical high school courses are considered to be extremely inadequate in addressing these many current problems which require interdisciplinary knowledge for their understanding. Unless our students are provided with the background knowledge and problem-solving skills they will need in their lives, until our classroom teachers address the social and ethical aspects of these problems, no one else will; the majority of our students will continue to base judgments that shape our future on intuition, short-term self interest, and political expediency.

There really have been no major changes in the teaching in secondary schools since the curricular reforms of the 1960s; consequently, we are still living on the proceeds of these reforms. Dramatic changes have taken place since those early post-Sputnik days--declining student interest, deteriorating student achievement scores. Perhaps even more important, the public's attitude toward education has shifted significantly during the past few decades. We have moved from an era of public confidence to one of suspicion, even antagonism.

In some respects, the prognosis for our planet appears to be bleak. However, the earth still retains considerable beauty, resources and vigor. Teacher educators, along with classroom teachers, need to keep reminding us that no matter where on earth we live, we must more fully appreciate that our earth is finite; its resources are limited. When some of us use more than our share, others will have to do without those resources. We still do not behave as if we realize that we are all in this together.

Very little in the realm of environmental education with respect to basic skills, recalling and imagining, comparing and evaluating, or deducing and inferring, for example, belongs solely to environmental education. What is specific to environmental education, as many of the papers in this publication have pointed out, is the content related to environmental issues. With this content, our special role is like that of any other educator--to provide every child with the best possible education. We need to prepare every preservice teacher, and to assist every inservice teacher, in any way that we can to help them become the best classroom teachers that it is possible for them to be.

Again, as you read about some of the programs described in this volume, you will note that several authors continue to emphasize that environmental education in the United States must be of the highest order if we are to remain world leaders in educational research and development. In our non-centralized system of education with shared responsibilities, local, state and federal governments have historically been involved in finance and educational policy-making; so have both private and public

institutions and parents and professionals. Although it has been developing for some time, when the national crisis in environmental education is recognized publicly, vast resources will be needed to produce the best equipped environmental education teachers in the history of education. We cannot afford to allow our state and federal agencies to shirk their responsibilities. Experience has shown by such things as the Land Grant College Act in 1862, and the establishment of the National Science Foundation in 1950, that government, public schools, and colleges and universities can strengthen research and education programs at all levels.

In the "Prologue" to this volume, Herb Coon has consistently pointed out strengths and highlights of good programs. The ultimate goal of environmental education is to produce environmentally literate citizens. To reach this goal, schools and universities are going to have to modernize instruction of preservice and inservice teachers. They must possess the academic freedom to deviate from their many established ways. The National Association for Environmental Education, the State Environmental Education Coordinators Association, and other professional organizations must help provide the necessary leadership in effecting necessary change.

Donald R. Winslow, Chairman
Department of Science and
Environmental Education
Indiana University

Bloomington, Indiana
December 1980

PREFACE

The studies in this volume were solicited by the editors, based on recommendations received from specialists in environmental education in the state education agencies. Particular assistance and support were provided by the State Environmental Education Coordinators Association. An attempt was made to secure studies from a broad spectrum of emphases. Most of the studies were written specifically for this compendium, on request. The editors thank the authors of these papers, and their institutions, for their willingness to prepare them, and particularly for their response to the admonition for straightforward reporting. The case studies are arranged alphabetically by last name of senior author.

Three earlier volumes of the Environmental Education in Action series were edited by Clay Schoenfeld and John Disinger. They are:

I. Case Studies of Selected Public School and Public Action Programs, published by ERIC/SMEAC in January 1977;

II. Case Studies of Environmental Studies Programs in Colleges and Universities Today, published by ERIC/SMEAC in February 1978; and

III. Case Studies of Public Involvement in Environmental Policy, published by ERIC/SMEAC in December 1978.

The State Environmental Education Coordinators Association, the membership of which is comprised of specialists for environmental education in many of the state education agencies, has worked cooperatively with ERIC/SMEAC in the development of many publications during the past several years. Primary purpose of the Association is to strengthen and promote the leadership roles of state environmental education personnel by providing a forum for dialogue and discussion, cooperating in studies of problems of mutual interest, promoting and encouraging environmental/conservation/energy education, providing a communications/dissemination network, supporting efforts to promote environmental quality, and cooperating with other governmental agencies and organizations concerned with environmental education. Barry W. Jamason of the New York State Department of Education is current president of the State Environmental Education Coordinators Association.

ABOUT THE EDITORS

Mary Lynne Bowman is an Associate Professor of Environmental Education in the School of Natural Resources and a Research Associate at the ERIC Clearinghouse for Science, Mathematics, and Environmental Education at The Ohio State University. Dr. Bowman teaches Natural History, Natural Resources Programs in the Urban Setting, Environmental Education in the Park Setting, and has conducted many environmental education workshops for teachers. Her publications include Environmental Education 1975: A State-by-State Report; Environmental Education in the Urban Setting: Rationale and Teaching Activities; Land Use Management Activities for the Classroom; Energy Activities for the Classroom: Volume II; Values Activities in Environmental Education; and Teaching Basic Skills through Environmental Education Activities.

John F. Disinger is a Professor of Environmental Education in the School of Natural Resources and Associate Director of the ERIC Clearinghouse for Science, Mathematics, and Environmental Education at The Ohio State University. He teaches courses in natural resources management and environmental education, and is also frequently involved in environmental education workshops for teachers. Currently, he is a member of the Board of Directors of the National Association for Environmental Education, and is treasurer of that organization. His publications include the compiling and editing of five editions of the ERIC/SMEAC Directory of Projects and Programs in Environmental Education; Environmental Education 1975: A State-by-State Report; Activities of Federal Agencies in Environmental Education; and Alliance Affiliate Activities: Non-Governmental Organizations in Environmental Education.

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ENVIRONMENTAL EDUCATION IN ACTION-IV: CASE STUDIES OF TEACHER EDUCATION PROGRAMS FOR ENVIRONMENTAL EDUCATION

PROLOGUE:

ENVIRONMENTAL EDUCATION IN TEACHER EDUCATION

by Herbert L. Coon*

Teacher education in environmental education poses special problems. State legislatures and state boards of education mandate new standards which force colleges or departments of education to add more professional education courses to teacher training programs. This is done despite the demand by many critics that undergraduate teacher education institutions reduce professional education courses so as to permit students to take more work in the academic area(s) they are preparing to teach, and despite the interest of college students in environmental problems and issues such as pollution, energy, food production, and population growth.

Additionally, the academic areas in colleges and universities have organized courses taught in their disciplines into tight, discrete packages with little opportunity for instructors to deviate from syllabi. It has been said that many undergraduate courses are taught with an emphasis on specific content which assumes that every student is interested in earning a Ph.D. in that department. Relatively few college courses are available which offer opportunity for multi-disciplinary study of environmental problems.

Undergraduate training programs for elementary school teachers have limiting factors which result in inflexibilities. In most elementary schools, certainly in grades K-4, individual classroom teachers are responsible for all instruction in mathematics, science, social studies, and language arts. Often these persons are also responsible for teaching art, music, health, and physical education. Acquiring a moderate level of competence in the content of these fields, plus confidence in knowing how to teach appropriate content from these fields for children, poses a horrendous problem for the prospective elementary school teacher.

Content courses in college or university for prospective primary school teachers have the typical format of lectures, readings, term papers, laboratories, mid-terms and finals. Unfortunately, these teaching strategies are not usable in the teaching of young children. The K-2 grade child can learn much about science through exploration of his environment, or by experimentation, but comparatively little through reading. The young child is constantly exploring his environment. He finds interesting things or objects which he brings to school to "share" with his classmates or, hopefully, to learn more about from his teacher.

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Can science courses, for example, be taught to undergraduates in such a manner as to enhance their usefulness in elementary school teaching? Can opportunities be provided to help teachers learn how to use the daily environment in which their children live to teach science, language arts, history, and other subject matter?

The broad term environmental education as now used includes the areas of outdoor and conservation education. During recent years increasing numbers of public school systems have provided overnight or extended (2-5 day) camping experiences for upper elementary school children. Undergraduates who help in staffing these school camping programs report the experience to be very helpful in learning how to use the outdoor environment to teach young children about conservation, recycling, ecology and other environmental education concerns. The reader will find the outdoor teacher education program at Northern Illinois University (p. 73) to be outstanding in the extent to which it involves all elementary education juniors (2-1/2 days) and seniors (4 days) in learning how to use, and then actually use, the University's outdoor education facilities.

It is possible for a college or university to develop new courses in environmental studies that are uniquely suited to the needs of teachers. The University of Vermont program (p. 53) appears to be a good move in this direction. The Iowa State University course, "Introduction to Environmental Education," (p.145) is another very promising attempt.

Elementary majors in teacher education become aware quickly of the environmental awareness of the young children they will teach. The young child's environment is immediate, concrete, impinging on senses: it is to be explored, tested, manipulated, understood--it is the source of the never-ending WHY!

The typical elementary school schedule provides a teacher, who chooses to use it, much more flexibility than is possible in most middle school, junior high school, or senior high school schedules. The longer blocks of time needed for outdoor activities, field trips, full use of resource persons, and study of community environmental problems are arranged rather easily in an elementary school.

Thus the orientation of beginning elementary teachers and the situation in which they work makes it relatively easy to incorporate meaningful environmental education into their instructional programs. Modest investments in incorporating more environmental education into undergraduate teacher education programs appear certain to produce rich dividends.

The undergraduate teacher education program for secondary school teachers in most colleges and universities includes little organized attention to environmental education concerns. The general education required course(s) such as botany, zoology, or chemistry are unlikely to give attention, for example, to ecological relationships or to the problem of acid rain. As he "works off" his general education

requirement, the prospective secondary school teacher is likely to take courses which focus on narrow aspects of various disciplines. The broad interrelationships of disciplines and problems found in considering questions such as "More Nuclear Power?" or "What Alternatives Are Available to Contain World Population Growth?" are likely to be available only in graduate seminars. Similarly, the general education courses available to undergraduates in social sciences and the humanities are unlikely to give much attention to current environmental issues.

The undergraduate major in secondary education is required to take several, often many, courses in the field in which he is preparing to teach. Despite this considerable immersion in the academic content of his field, he is made aware--sometimes painfully so--by graduate students or by professors who prefer to work with graduate students, of what he still doesn't know in his field. This concern for academic content, particularly as it is found in textbooks, becomes an obsession with some secondary education majors. When they graduate and accept teaching positions they "teach the book"; they are very uncomfortable with those inquiry methods of teaching which must be used to examine environmental issues.

Life science and social science teachers as they have gone through their undergraduate training have experienced a number and variety of courses which have given attention to the history, status and future of some environmental concerns. Whey they accept teaching positions, these two groups are the ones best prepared to incorporate environmental education into their teaching. But it is often easier to teach from a text, and it is sometimes unwise politically to involve public school students in examining controversial environmental issues in the community.

The case studies included in this publication support the contention that few undergraduate programs in teacher education prepare give much attention to the content and processes involved in studying major environmental questions.

Graduate teacher education programs have been far more successful than undergraduate programs in accommodating teachers' desire for environmental education. This condition is due, in part, to the freedom given to graduate students and their advisers to choose among courses, workshops, independent study, seminars, and other learning experiences with environmental emphases.

Some colleges and universities have formalized programs leading to Master's degrees in some aspect of environmental education. The Master's Degree in General Studies--Outdoor Education available at Southern Oregon State College (p. 89) is such an example. Colleges of Education and/or Schools of Natural Resources in large universities typically have advisers who are willing to plan master's and doctoral programs for graduate students. Such programs may well include courses from several disciplines which offer insight into environmental problems and their solutions.

Environmental teacher education in recent years has had limited success in terms of practicing teachers who have earned graduate degrees in this area. Environmental teacher education has had great success, however, in becoming a prominent aspect of in-service teacher education. In recent summers, thousands of teachers have participated in two or three-week energy education workshops of various types. Often these workshops have been supported financially by federal agencies such as the Department of Energy. The workshops, frequently offered for college or graduate school credit, have provided excellent opportunities to disseminate environmental education materials or to involve participants in preparing their own lesson plans in this area. The Florida State University program (p. 9) reviews a highly successful effort to promote energy education and its broad ramifications for environmental education generally.

Thousands of teachers throughout the United States have been involved in other types of summer workshops related to environmental-outdoor-conservation education. Some are specific to a geographic area such as "A Marine Environmental Education Inservice Program for Northern New England" (p. 27) offered by University of Maine at Orono. Summer workshops studying fauna, flora, and conservation of an area have proved to be popular. Teachers who have participated in these intensive summer workshops, which often include live-in arrangements at off-campus sites, tend to rate such experiences as high points in their professional education.

Inservice opportunities in environmental education are limited only by the imagination and initiative of concerned parties. The breadth of offerings made available by Huxley College at Western Washington University (p. 99) suggests possibilities. One can only applaud the technique of involving practicing teachers in identifying environmental issues they wish to know more about.

The practice of using local experts to examine local environmental problems also merits wider use. The list of agencies and organizations used to provide instructional assistance in the Iowa Summer Program In Environmental Education (p. 39) locates many "bridges" between school classrooms and real life in the community. Teacher educators who desire to incorporate more environmental education into undergraduate as well as graduate programs are advised to make greater use of lay persons who are knowledgeable about selected aspects of environmental issues. Such persons generally are willing, often eager, to give of their time and knowledge. These persons and groups they represent such as garden clubs, Audubon Society, sportsman groups, and conservation groups also frequently provide funds for in-service environmental education of teachers.

Several case studies in this publication illustrate the advantage of "taking environmental education to teachers" rather than requiring that they come to college classroom settings. Busy classroom teachers may be able to find time during the school year for a weekly continuing education meeting if it is offered near their place of work, but find it too difficult to commute to the campus where they take graduate

work during the summer. This arrangement of off-campus teaching also encourages the enrollment of the older, more experienced, teachers. Teachers who may hold advanced degrees may still be interested in an "easy-to-take" environmental education course or workshop focusing on environmental problems important in their communities. And as mentioned earlier, the off-campus arrangement encourages the identification and use of valuable resource persons from the community.

Nationwide concern about environmental problems appears to be less than it was a decade ago, at least in terms of news media coverage. Many of the problems which resulted in Earth Day, Sun Day, 55 MPH speed law, formation of the EPA, and similar actions have not been solved. The problems remain somewhat submerged in the lake of major societal concerns ready to spring forth to national prominence if provoked by factors such as severe drought, nuclear plant accident, oil embargo, or major crop failures.

The need to learn more about environmental problems and alternative solutions to these problems has not diminished during the past decade. The reader of this publication can easily identify several areas of environmental concern which have worsened, as well as some which have improved during that time.

Elementary and high school students will, in the years ahead, continue to be interested in aspects of the environment which affect their present and future lifestyles. And teachers, beginners as well as experienced, should become better prepared to help students examine these matters carefully. Teacher education institutions are aware generally of the need to better prepare preservice and inservice teachers in the area of environmental education.

Fortunately, some institutions whose programs are reported in this publication have taken steps to move from generalized concern to specific action. Their successful efforts give promise of an expanding role for environmental education in teacher education--particularly in the in-service area.

TEACHING ABOUT THE ENVIRONMENT AND ENERGY IN FLORIDA: INSERVICE PROGRAMS AT FLORIDA STATE UNIVERSITY

by Rodney F. Allen*

Inservice teachers have the opportunity to participate in two types of environmental energy education programs at Florida State University. During the academic year, three- and five-day workshops which stress energy/environmental awareness and curriculum materials, and familiarize teachers with appropriate concepts and issues are offered. Two-week summer institutes provide a more intensive overview of world, United States, and southeastern energy supply-and-demand figures and forecasts. Conservation strategies, ethics of responsibility, and justice are also stressed. Curriculum materials are reviewed and developed as culminating activities.

The Arab oil embargo during the winter of 1973-4 was followed by summers of brown and black outs. Natural gas shortfalls, soaring utility bills, and gas mileage were added to the national consciousness. During the 1970s and now into the 1980s new energy realities will also be thrust upon the unwilling citizenry. These new realities will also be thrust upon the life styles and expectations of children who now populate our nation's schools.

Hoping that these children as adults will be more understanding and responsible, educators have begun to incorporate energy concepts and issues into their teaching about the environment. Energy flows in human as well as natural systems are highlighted. To the environmental ethic, educators are adding elements of an energy ethic.

At Florida State University, environmental-energy education programs for inservice teachers have been designed to assist them in infusing energy and environmental issues into their curriculum, K-12.

As we developed our programs over the past eight years, we tried to avoid the old "agriculture research station model" where experts have knowledge and power, and then, hand knowledge down to clients for them to use. We have also tried to avoid the publisher, professor of education, and curriculum project models, which depend upon handing down products and ideas with the expectation that teachers will carry them into the classroom and dole them out to students. These styles violate major ethical principles involving the growth, competency, and power of classroom teachers. As a minimum expectation, efforts to foster curriculum change should:

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identify needs with the community to be served;

design curriculum programs with maximum possible participation of the potential users;

foster the development of competence and a sense of power (ownership) within the community to be served;

promote the exploration of alternate means to educational goals, and of the rationality of the users' goals; and

retain the "education" in energy education by resisting persuasion or the imposition of a given set of opinions, judgments or conclusions. (Allen & LaHart, 1977)

We have cooperative model, where professors bring lessons and units to the teachers as springboards. The time spent together in workshop sessions is devoted to learning about energy concepts, issues, and values and in adapting those lessons and units for the teachers' students. We use two types of workshop formats. During the academic year, we offer three and five day in-service workshops where the teachers are released from regular teaching duties. During the summers, we offer two-week energy education institutes for teachers of English, reading, science, social studies, and home economics. These programs are described in the following section.

Academic Year In-Service Programs

These programs are arranged with local Teacher Education Centers and planned with support from the Governor's Energy Office and the Florida Office of Environmental Education. The three-day version stresses energy/environmental awareness, familiarity with appropriate concepts and issues, and the critical review of various published energy/environment curriculum materials. Teachers are released from school teaching duties on a Thursday and Friday, and they contribute the following Saturday. The five-day version involves a two day follow-up writing session, some two or three weeks after the initial session. Teachers return to their classrooms and try out ideas. They prepare the drafts of several lessons. When they return for the last session, the time is spent rewriting and reviewing teacher-produced and teacher-adapted lessons. This session is normally held on a Friday (with teachers released from classes) and a Saturday.

In both programs the teachers learn from five outside speakers from the business and academic communities who have environmental/energy credentials. They receive copies of over thirty units for adaptation and for sharing with colleagues in their schools. The programs are focused upon the following objectives:

1. Each participant will be able to define the "energy crises" in terms of supply and demand, in terms of costs, in terms of eco-systems, and in terms of value dilemmas.

2. Each participant will be able to raise questions which would encourange student clarification and definition of ideas on energy concepts and conservations.

3. Each participant will be able to assess critically, extant free and inexpensive curriculum materials dealing with energy education.

4. Each participant will be able to design springboards linked to students' personal life-space and conceptual level, which will foster student inquiry toward concept attainment, hypothesis formulation, data collection, inferring, generalizing, and stating conclusions. (Five-Day version only)

5. Each participant will be able to plan inquiry activities which link to the personal behavior of students as energy consumers and to societal issues involving energy production, distribution, and consumption. (Five-Day version only)

6. Each participant will be able to encourage inquiry in the instructional setting (e.g., classroom, field-trip site) and build-in rewards for the free exchange and exploration of ideas and values.

7. Each participant will be able to pose questions on energy springboards which would result in student testing out hypothesis and in grounding value positions.

8. Each participant will be able to discern student learning and development, as those students use inquiry-based lessons on energy and energy conservation topics. (Five-Day version only)

Teachers completing the five-day workshop turn in their adapted or original lessons for editing and printing. The local Teacher Education Center staff is responsible for typing and printing this booklet of lessons for distribution to the teacher-participants, to other teachers in the county, and to the ERIC system. The booklets average 75 pages. Some of the better lesson booklets have been reprinted by the Governor's Energy Office and the Florida Office of Environmental Education for state-wide distribution.

Teachers in these workshops receive in-service, Teacher Education Center credit toward certification and the renewal of certificates. No university credit is given.

In organizing these workshops, we follow the principles noted above and the following principles:

1. The approach is always focused upon the practical: What can I use with my students on Monday morning? What ideas can I use now in my thinking about energy/environmental issues as a

citizen and as a teacher? We spend little time on theory, especially educational theory.

2. We offer no afterschool in-service programming, when teachers are tired. We do no required teacher in-service day programming, when many uninterested participants spoil the excitement of those who want to be there and learn from the group. We only work with volunteers and deliberately plan Saturday sessions to discourage those interested only in certificate renewal points and other such external rewards.

3. We deliver services to teachers on their turf--in their localities. But we hold the workshop sessions outside of schools. We go to convenient, non-classroom settings, such as a State park, a nature study center, or a civic center. This helps to break traditional school-bound responses, especially since teachers are asked to dress informally and do many activities out-of-doors.

4. We plan activities for thirty or fewer volunteers, including parents and civic leaders. We do not do any large group presentations or activities.

5. We work as colleagues, assisting teachers and learning together, rather than as critics, lecturers, or experts. Our speakers are selected with this idea in mind, and are evaluated on this point.

6. We open all programs with a "welcome" by local community and school officials to legitimatize energy education as a theme worth infusing into the local school curriculum. We use State educational officials in the same way--to reinforce the idea that the State values and supports environmental/energy education.

7. We try to build in significant rewards for participating teachers, academic and material. We try to teach what they will value as adults and find worthwhile in their lives. Second, we use the published lesson booklet to serve as recognition for their efforts. The distribution of this booklet serves this purpose well, especially in rural counties. Third, we try to build peer support and support from school officials, parents, and community leaders who are invited to all workshop sessions.

8. Each day's activities are evaluated on a formative assessment sheet, rather than waiting to the end of the workshop. In this way, we can make on-going adjustments to meet teacher needs.

9. Local teacher education center personnel provide follow-up contact with the teacher-participants, stressing matters related to getting local resources to support

their teaching. From the University we provide follow-up assistance with a minimum of three mailings over four months after the workshop. We send new units, articles, and teaching aides. Often, we are able to schedule a one-day session on-site meeting with all of the participants after they have been teaching for four months. This allows for the renewal of commitments and a chance to develop some more sharing among the teachers and our staff.

Summer Institute Programming

With support from the U. S. Department of Energy, we have conducted a number of programs for teachers of English, reading, science, social studies, and home economics. These have been two-week institutes, and the most recent have stressed the role of the humanities and humanities teachers in energy/environmental education. While professors of science have made presentations on fundamental energy concepts and issues, the focus has been upon the ethical and world-view issues around the human use of energy and the natural and social consequences. Professors from philosophy, religion, Asian and American Studies, and literature have made presentations to the teacher participants.

These summer institutes are based upon the following principles:

build upon existing courses and programs in the school curriculum and develop existing teacher and staff resources;

support teachers' views of themselves as professionals in education, professionals who are providing a real and important service to students and society (assertiveness-power);

assist teachers in becoming rational consumers of existing energy education information and instructional programs (control);

provide the time and resources for teachers to develop the knowledge and talent to discern the complex nature of energy concepts and issues, and to assess the dimensions of what is being called "the energy crisis";

permit teachers to develop cooperative goals and objectives of energy education as integral parts of their curriculum program, or as an integrating vehicle for multidisciplinary programs within the demonstrated needs of students (responsibility);

allow teachers to invest themselves in the adaptation of existing materials and/or the development of new instructional materials to meet their students' needs and the demands of their local situation (ownership);

develop in schools a cadre of teachers from several desciplines who are advocates of energy education, having credibility, recognized competence, and the trust of colleagues and school administrators;

build support groups within a school for energy education innovations across discipline lines (e.g., social studies and home economics);

build support for teachers' innovations in energy education among community leaders and among local and state educational leaders who have resources and who serve to legitimate the support groups' innovations.

The first week of these summer programs is intensive. Teachers are given an overview of world, United States, and Southeastern energy supply and demand figures and forecasts. They examine energy flows in natural and human systems, stressing the environmental and social consequences of actions in these systems. Included in this are systems of thought--religious-philosophical systems--which direct perception and guide human actions in those systems. Scholars work with teachers on specific sources of high-grade energy: coal, petroleum, natural gas, nuclear, and solar. Conservation strategies are given practical attention before moving into public policy questions. We use a panel of ethicists to deal with the ethics of responsibility and the ethics of justice as two ways to analyze and to make energy policy decisions.

An optional field trip to a local power plant is available, and teachers also have the option of on-site visits with energy policy-makers: State legislature committee staff, Public Service Commission leaders, Governor's Energy Office personnel, nuclear researchers, and others.

During the second week, teachers are involved in reviewing existing curriculum materials and developing (or adapting) extant materials for their students. English teachers might draw on a science unit to provide writing activities. A reading teacher might redo a social studies unit for vocabulary development and reading skill improvement. The home economics teacher works with a professor of Asian Studies on energy conservation and housing/interior decorating patterns. The ethics professor labors with a teacher team on lessons dealing with the justice in national stand-by gasoline rationing plans.

In all of these lesson adaptations, we try to achieve a sequence or a flow in the lessons. The component parts begin with the immediate life experience of students and their personal concerns (power, identity, trust, belongingness, usefulness, etc.). We build in hard knowledge from the natural and social sciences, such as conversion loss, energy flows, cause-effect, attitude change theories, and so forth. These are complemented with central value concepts required for dealing with personal and societal choices: justice, caring, altruism, rational consent, equity, and liberty. Skills of the following type are emphasized:

a. creativity-imagination
b. empathy-role-taking
c. social participation
d. strategy planning
e. cognitive inquiry skills
f. group building skills
g. communication skills (reading, speaking, writing)
h. ethical reasoning skills
i. research skills

At the conclusion of any lesson we hope to involve students in decision-making on matters of personal behavior/consumption and upon public policy involving energy and the environment. This, we always hope, will lead to action opportunities for each and every student.

Another way of looking at the flow of lessons is illustrated in Figure #1. The teacher uses a springboard to open the lesson (a stimulus). This may be a song to sing, a problem to solve, a ten minute mini-walk out-of-doors, or a diagram to ponder. It offers students an interesting experience, which gets them to use their entry knowledge and abilities.

The teacher of the activity assignment then asks students to reflect upon the springboard experience. WHAT? questions are used to create personal awareness of something related to energy conservation (i.e., energy, a mine, a campfire burning) or to create personal awareness of some response in-here, inside themselves (i.e., the way they feel, what they think, what they value).

The teacher or the activity assignment then asks SO WHAT? questions so that students may reflect on the meaning that they make of the phenomena that they are aware of. So what if people waste energy? So what if you believe that it is okay to leave the doors open to an air conditioned house?

These questions are followed by FOR WHAT? questions. What values do you place on what you have become aware of? Is energy loss desirable or undesirable? Why? Is the behavior of those friends and family worthy and related to the way you feel energy resources should be utilized?

HOW? questions are used throughout the process. Many skills are developed and used. Communication skills, inquiry skills, reasoning skills, and creative abilities have a part to play. Students need to learn how to share their thoughts effectively with others. They need to learn how to pose inquiry questions, shape hypothesis, and collect information by careful observation. They need to be able to give reasons to justify a judgment, or to ask questions about another's position. They need to know how to communicate their feelings, values, and positions in creative ways--art, song, essays, short stories, poems, etc. And, of course, the students need to develop social participation skills so that they can speak coherently before a group, write letters to officials and work sensitively and effectively with others in a group.

NOW WHAT? questions ask students to decide upon a new way to think, feel, value, or act. For that you are aware of something. It is

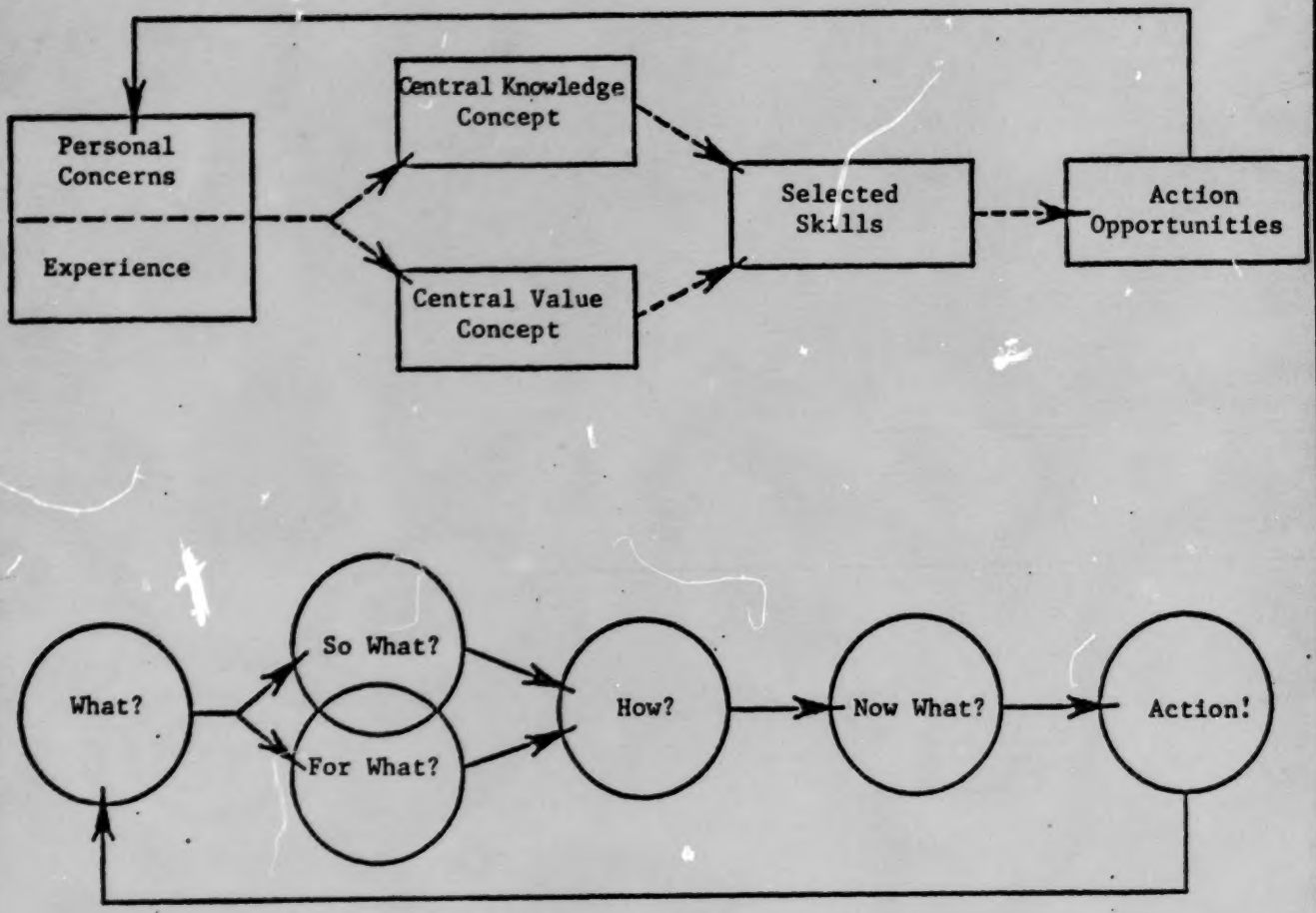
Personal Concerns
Experience
Central Knowledge Concept
Central Value Concept
Selected Skills
Action Opportunities
What?
So What?
For What?
How?
Now What?
Action!

FIGURE 1

significant to you and you understand it, what do you want to do? What action do you want to take?

An ACTION simply provides the opportunity for students to do something which they have decided upon--paint a picture, alter their value priorities, work for the conservation of energy, or to role up their sleeves and devote a Saturday to sealing windows and doors to reduce energy loss.

EVALUATION ABILITIES serve as a feedback loop. That is, teachers and students reflect upon the process which they have just gone through. What went right? What went wrong? What can we do differently?

At the end of the two-week institutes, the teachers' lessons are edited and printed for distribution to them and to their colleagues at their schools. Follow-up mailings are used to renew teacher commitments to energy education and to replenish their stock of new units and materials to support additional instruction on energy issues.

Conclusions

Our guidelines for energy education seek effective energy and environmental education programs in schools while developing the professionalism and competency of classroom teachers. *Cooperation* is our watchword. (Allen & LaHart, 1977).

In proposing a national energy plan during the Spring of 1977, former President Carter observed:

> ...meeting the nation's energy goals should be a great national cooperative effort that enlists the imagination and talents of all Americans.

The same cooperative spirit, enlisting the talents and imagination of governmental agencies, school personnel, community leaders, and classroom teachers, applies to the goals of energy education. No one set of agencies, or organizations, ought to impose educational goals or curricula upon teachers, thus usurping their innovative ability and co-opting their talents. Energy education ought to maximize the role of teachers in setting goals, planning curricula, and implementing programs. Our efforts in Florida have been cooperative with many agencies and have successfully enhanced not only environmental and energy education...but have done so by complementing the development of teachers as masters of their own guild.

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SUMMER INSTITUTES IN ENVIRONMENTAL EDUCATION: SOUTH CAROLINA

by Lance E. Bedwell*

A three-week summer environmental studies institute developed by the South Carolina Environmental Education Association is currently offered in four of South Carolina's state colleges and universities. Both pre-service and in-service teachers from all grades and disciplines address those environmental issues, and resources of South Carolina which may be incorporated into existing school subjects. Various teaching methodologies and extensive field work are also included as a part of the institute.

The Institute of Environmental Studies Program, conducted in South Carolina for the past several years, was developed by the South Carolina Environmental Education Association with the cooperation and support of many industries, agencies, and organizations. The Association continues to assist in sponsoring the program on the campuses of four of the state colleges and universities. The institutions currently offering the program as a three-week summer course include the University of South Carolina, The Citadel, and Clemson University. Coker College schedules the program for undergraduate credit during the regular spring semester.

The institutes are offered for all teachers and administrators, grades K-12, in any discipline. Each institute offers participating pre-and inservice teachers an opportunity to learn about their total environment from local, state, and federal resource personnel in government, industry, and education. Participating teachers have an opportunity to meet natural resource agency representatives and obtain their educational and informational materials. The natural resource agency representatives also assist the teacher in utilizing various resources in their particular classroom situation. Field experiences in the institutes are many and varied and include methods of teaching in the out-of-doors.

Participating teachers receive credit at either the graduate, undergraduate, or recertification level and are responsible for the tuition charged by the institution they attend. However, scholarships are available from several sources (e.g., local Soil and Water Conservation Districts and Garden Clubs). All transportation and lodging costs (for overnight field trips) are furnished.

The remainder of this report describes in some detail the Institute of Environmental Studies as it is conducted at the University of South Carolina. Since all of the institutes are similar in content and

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direction, the program at the University serves as an example of summer environmental education institutes in South Carolina.

Introduction

An environmental education summer institute has been conducted for the past eight summers using the facilities of the University of South Carolina. The University of South Carolina is a state-supported coeducational institution. Its 222 acre main campus is located in the state's capital city, Columbia. Academically, the University consists of seventeen schools and colleges offering degree programs at the associate, baccalaureate, master's and doctoral levels. A faculty of 1,550 serves a student body of over 20,000 on the main campus and more than 6,500 on eight regional campuses throughout the state.

The facilities for the institute are provided by the Marine Science Program and the Belle W. Baruch Institute for Marine Biology and Coastal Research. Baruch Institute facilities on the main campus in Columbia include several modern laboratory facilities equipped with a wide range of scientific instruments. Field laboratory facilities are located on Hobcaw Barony, a 17,500 acre natural preserve near Georgetown, South Carolina. Laboratory facilities, situated on the edge of the marsh, include a modern well-equipped 5,000 square foot laboratory, equipment for sampling the marsh-estuarine area, small boats and diversified collection gear. The Kimbel Learning Center and field dormitories are located near the laboratory facilities.

Purpose

The Institute of Environmental Studies conducted at the University of South Carolina has been designed specifically for teachers in school districts in the State of South Carolina who wish to acquire additional knowledge and understanding of the ecology of the region and environmental education teaching strategies and resources in order to serve as a teacher/consultant in the development of local environmental education programs.

The primary purpose of the institute is to acquaint public school teachers from all grades and disciplines with the environmental issues, agencies, and resources of South Carolina which may be incorporated in existing school subjects. Presentations by local, state, and federal resource agencies and organizations, largely in the field, include not only resource information but methods of teaching it to elementary and secondary students.

Previous participants have been teachers from the state of South Carolina and the majority were from the Columbia area since the University is located in that city. An effort was made, however, to involve participants from other geographic areas of the state.

Objectives

After participating in the institute, each teacher should be able to:

1. describe a minimum of four environmental issues listing both pro and con arguments,

2. describe at least two functions of each of five selected local, state or federal resource agencies,

3. describe four selected natural and/or man-made resources of South Carolina,

4. define selected general ecological terms,

5. describe selected ecological principles,

6. prepare a unit of instruction for his/her subject area which incorporates an environmental theme (or) prepare a similar project which could also be useful in his/her teaching (e.g., a tape/slide program).

Instructional Program

A variety of instructional formats and modes are used in the institute. For example: (1) Representatives of various local, state, and national agencies concerned with the environment serve as guest speakers, (2) Lecture/discussion sessions are presented on fundamental ecological concepts, and (3) Participants are also involved in completing library readings and the preparation of individual projects.

To meet the needs of the participating teachers and the objectives of the institute, three major areas of instruction are undertaken during the summer institute:

1. Fundamental Ecological Concepts

   A general overview of the fundamental ecological concepts relevant to South Carolina with emphasis on the marine model.

2. Teaching Resources of South Carolina

   A survey of the resources that could be incorporated in the development of an environmental education program including human resources representing local, state, and federal resource agencies and organizations.

3. Program Development

   Presentation of and practice in using procedures to develop unique local environmental education programs.

The following is an outline of the institute instructional program:

Week	Activity	Number of Days	Area of Emphasis
1.	Introduction to Environmental Education presentation by state E.E. Consultant	1	Program Development Teaching Resources
	Forestry field trips and guest speakers	2	Teaching Resources
	Soil Conservation Service field trip and visit to outdoor classroom	1	Teaching Resources Program Development
	Environmental Education programs and methods-Institute Director	½	Program Development Teaching Resources
	Department of Health and Environmental Control guest presentation	½	Teaching Resources
2.	State park field trip and guest speakers from U.S. Forest Service and S.C. Dept. of Parks, Recreation and Tourism	1	Teaching Resources Program Development
	Coastal ecology presentation by Marine Science Faculty	1	Ecological Concepts
	Geography and Geology of S.C. presentation by U.S.C. Geology Department	¼	Teaching Resources
	Mining in S.C. presentation by S.C. Land Resources Commission	¼	Teaching Resources
	S.C. Wildlife and Marine Resources Department presentations	½	Teaching Resources
	Environmental Education programs and methods-Institute Director	½	Program Development Teaching Resources
	Forum with representatives of citizen organizations	½	Teaching Resources
	Presentation by representative of the Governor's energy office and field trip to solar installation	½	Teaching Resources
	Field trip to nuclear plant	½	Teaching Resources
3.	Coastal Ecology field trip and lectures	2	Ecological Concepts Teaching Resources
	Ground water problems presentation by S.C. Water Resources Commission	¼	Teaching Resources
	Historical preservation presentation by S.C. Dept. of Archives and History	¼	Teaching Resources
	Environmental Education programs and methods-Institute Director	2	Program Development Teaching Resources

The institute meets Monday through Friday from 8:30 a.m. until 3:30 p.m. All class activities other than field trips are held in the Marine Science facilities on the main campus of the University of South Carolina. Field trips to coastal areas utilize the facilities of the Belle W. Baruch Institute for Marine Biology and Coastal Research.

Credits

Participants may elect to receive credit in Marine Science 777-Environmental Education for Teachers. The three credit course is utilized by some students as an elective in a Masters program and by others as credit toward state recertification.

Evaluation

The first five objectives are evaluated through the administration of a final examination. Objective six is evaluated by an examination of the unit of instruction or similar project prepared by each participant. Based on participant performance on the final examination, all students master the material above the eighty percent level. The projects and units of instruction also have been found to be of very high quality.

Although affective objectives are not specifically evaluated, an end-of-course evaluation form is used to obtain feedback and suggestions from participants. The results of several administrations of this form have consistently shown the participants to have a high positive attitude toward the course and environmental education.

Future Plans

As originally planned, the University system has continually absorbed more of the costs of operating the institute. Costs not absorbed by the University, to date, are field trip travel and secretarial assistance. These costs are paid by the South Carolina Environmental Education Association. It is expected that the University system will eventually pay all the costs of the program.

A proposed follow-up program would improve the effect of the institute by making use of the 'multiplier effect' in order to reach larger numbers of teachers with meaningful assistance and encouragement in the development and implementation of environmental education in their classrooms. Each participant would be expected to work to develop local environmental education programs with teachers and administrators in their local school district during the academic year following the summer institute. This would provide inservice instruction for a larger number of teachers as well as promote the development of local environmental education programs.

Four ½-day follow-up seminars (two per semester) to be held in Columbia would be concerned with two areas of instruction. Approximately 2/3 of the time would be devoted to presentation of and practice in using procedures to develop unique local environmental education programs.

The remaining time would be spent on problems participants are experiencing in their district. The seminar instructor would monitor each participating school and visit as necessary to aid in environmental education infusion.

The proposed expansion of the environmental studies institute could also serve as a model for the improvement and expansion of summer institutes at the other cooperating colleges and universities.

Additional Information

For additional information, contact the author or Dr. John Mark Dean, Director, Marine Science Program, University of South Carolina, Columbia, SC 28208.

SCIENCE AND ENVIRONMENTAL EDUCATION CONCENTRATION THROUGH ELEMENTARY AND MIDDLE CHILDHOOD MAJORS: METROPOLITAN STATE COLLEGE

by Jeff Brigham*

The School of Education at Metropolitan State College in Denver offers strategies for specializing in environmental education at the undergraduate level in both elementary education and early childhood education. Both programs emphasize the placement of students in public school settings. The elementary education program examines the place of environmental education in K-6 curriculum, while the early childhood education specialization focuses on environmental education in the pre-school setting.

Undergraduate students who are preparing to teach in elementary schools or in early childhood centers are offered a dual strategy for specializing in science and/or environmental education.

The general goals of the two areas of concentration are to:

1. Encourage children to inquire into the "why" of natural phenomena.

2. Be alert to means of improving his/her environmental awareness.

3. Seek opportunities for better perceiving professions related to conservation.

4. Be able to diagnose pupil behavior and to prescribe instruction for learning conservation practices.

5. Identify teaching strategies which are innovative in promoting students' development of an environmental ethic.

6. Seek instructional improvements which promote conservation of the natural environment.

7. Behave more as a consultant and guide in encouraging children's attitudes regarding the beauty of the natural environment.

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Freshmen and sophomores may choose an initial field placement which introduces them to environmental/science education practices in public schools. Also, a first exposure is given, so that students see subject integrations within environmental education.

Two class-lab combinations follow in the junior year of study. Urban Education and lab place the student in an urban elementary school where emphasis is given to environmental education within a major U.S. city. Again, the student is supervised by the College; the public school and College guide the MSC student's activities with children as they come to understand the utilization of a city's green areas and its open areas. Another class-lab combination--Elementary School Curriculum examines the place of environmental education in the curricular organization of K-6 schools.

The senior year of study proffers courses in science and environmental education methodology and complementary lab (field) placement. The student refines his/her environmental education teaching skills as s/he works with area public school districts which have outdoor/environmental education sites. An example is the Jefferson County Public Schools. The district maintains two sites, Mt. Evans Outdoor School and Windy Peak Environmental Center. Student teaching and a follow-up "professional practicum" ask the student to perform as a licensed teacher to plan, to organize, and carry out environmental education for children.

The student majoring in early childhood education pursues virtually the same route. However, his/her first class-lab combination is in a preschool setting, under the direction of the syllabus--An Introduction to Early Childhood Education. While this is taken in the freshman year, the dual class-lab combinations referred to above serve for the sophomore and junior years of study. And the senior year proceeds as in the case for elementary education major students. The ECE student has a broader background in the child growth and development aspects of teaching children.

Both major programs, however, emphasize the placement of students in public school settings. These learning/teaching situations are those recognized as environmental education oriented field placements.

A MARINE ENVIRONMENTAL EDUCATION INSERVICE PROGRAM FOR NORTHERN NEW ENGLAND: UNIVERSITY OF MAINE

by John W. Butzow*

This Marine Environmental Education program trained 30 inservice teachers during summers 1979 and 1980 in the use of interdisciplinary marine science and social studies curriculum materials, particularly those developed over the past three years with funding supplied by UMO Sea Grant and the UMO College of Education. Training centered on these scientific, social-political, and technical issues which teachers need to understand to teach environment and career-oriented marine studies.

The project brought together public elementary, middle, and secondary school teachers and marine specialists in three major settings: the University campus at Orono, central and southern Maine coast field trip sites, and the Robert S. Friedman Cobscook Bay Laboratory. Participants also helped to direct a follow-up marine education conference each autumn, and organized local workshops for teacher-colleagues in their local school districts.

This project aimed at building and utilizing a model in marine environmental teacher inservice education for rural states with low population densities.

Project Objectives

The Northern New England Marine Education Project of the University of Maine at Orono and the State of Maine Department of Marine Resources[1] had the goal of helping different groups of 30 teachers each year 1979, and 1980 from Northern New England (especially Maine and New Hampshire) increase their ability to teach practical marine science, social studies and technical content, skills, and attitudes as part of their regular assigned grade level and/or subject matter areas. We were most especially interested in participants who taught science and/or social studies in grades 5, 6, 7, 8, and 9.

Northern New England was experiencing a modest but rapid rebirth of its marine, fishing, and associated industries as a result of the "200 mile economic zone legistlation." This had caused a great deal of interest on the part of schools and teachers during the last 5 years in marine related studies. In a recent survey of inservice and curriculum needs expressed by for teachers in Maine[2] marine and aquatic topics ranked very high among areas where information and help were desired. Specific examples

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(grades 5-12) include geological history, marine ecology, marine field trips, marine fishing methods, marine invertebrates, ocean industries and land use/shore planning.

This program through its summer workshop aimed at upgrading the marine science and social science background of participating teachers as a way of infusing a marine emphasis into science and social studies, grades K-12 in the bi-state region. A further goal was the ripple-multiplier effect of project participants who helped to organize and conduct a marine education teachers' conferences each autumn. Each participant conducted a local workshop for grades K-12 science and social studies teachers in his or her own school district. An associated objective was the dissemination of curriculum materials (especially the science and social studies oriented ones) developed by the Northern New England Marine Education Project.

Program History

The Northern New England Marine Education Project (NNEMEP) and associated marine education began 5 years ago when funding was obtained from UMO[3] Sea Grant to develop a teaching module for pre-service science teachers and to produce an annotated bibliography on teaching marine education topics. Both subprojects allowed the collection of a library of marine education curriculum materials of national scope.

The analytical work done to produce the bibliography pointed out strengths and weaknesses of the sources we collected. Of all the programs evaluated one, Project COAST, developed by the late Dr. Robert Stegner of the University of Delaware, appeared to be both the most comprehensive and regionally modifiable. In cooperation with agents of UMO's marine advisory service and Cooperative Extension Service, we had coastal Maine and New Hampshire teachers trial teach selected COAST units. Teachers reported to us problems of different marine commercial fisheries, geomorphology, and climate from Delaware so we could rebuild COAST materials for our region. Teachers also suggested that Maine/New Hampshire schools needed units on topics not considered in COAST such as the lobster (Homarus Americanus).

Recognizing the problems for our use of project COAST we submitted a funding request to Sea Grant and were funded to develop a modified project COAST curriculum for grades K-8 as the objective of our 1977-78 project. Our 1979 project produced curriculum materials for grades 9-12. We are currently funded by NSF to update five of our Sea Grant supported units and conduct conferences for school administrators during the 1980-81 academic year.

We were joined by Ms. Lorraine Stubbs, marine education specialist of the Maine State Department of Marine Resources (DMR) in our marine education work in August 1978. Her position was originally funded by an act of the Maine legislature (1977 statutes Chapter 603, section 6052.2). Her efforts continue the long tradition of the DMR (originally started in the late 1940's) of providing materials for science teachers on commercially important marine fish and invertebrate species. These materials became

outdated and had not been available for several years. Ms. Stubbs has redeveloped and continues to upgrade DMR published marine education materials which are provided to and distributed by our participants.

Both projects, NNEMEP and the education work of DMR called for teacher training activities during the year 1979-80. While DMR could provide personnel to this effort neither DMR or UMO had the funds to provide training directly to teachers in an extended summer workshop setting without National Science Foundation Funding. DMR provided a staff member as well as its resources, laboratory facilities and scientific personnel during field experiences at the DMR laboratory at McKowan Point, Boothbay, Maine. The DMR personnel and facilities were provided at no cost to this training project except fuel for its research vessel, MV Challenge.

Our activities in Northern New England to provide for marine education were greatly influenced by the work of Dr. Harold Goodwin and his national effort to adequately describe the objectives of Marine Education[4]. We were funded indirectly by National Sea Grant to provide assistance to the evaluation of his draft documents. Cooperatively with Dr. Goodwin, we held two annual conferences of Marine Education in 1976 and 1977. Each of these conferences drew several hundred teachers from the region to the UMA campus for day long discussions on marine education. At each conference, needs assessment questionnaires indicated two major needs of Northern New England teachers in marine education: funded workshop training and regionally based curriculum materials development.

Our first year's participants have assisted informing the Gulf of Maine Marine Education Association, GOMMEA, a chapter of the National Marine Education Association. Our second year's group conducted its Autumn Conference on November 7-8, 1980.

Project Operation

This project was fiscally centered at UMO although the Maine State Department of Marine Resources was an equal partner in program execution.

Project Plan

1. University Campus and Inland Maine

   The program began at UMO with an intensive week long overview of marine education content. Participants were provided field laboratory and lecture experiences in the major scientific disciplines relevant to marine and aquatic environment. Participants were also introduced to the concept of marine and aquatic resource utilization. This was followed by a two day field experience on aquatic and glacial topics conducted in Baxter State Park (about 100 miles northwest of the UMO Campus). The last two days had participants involved in caring for cultures of invertebrates and marine algae. They also made extensive reviews of the content of the

existing marine education curricula. Guest marine and aquatic specialists who assisted during this week included an expert on the technology of marine shipping, (Dr. John Battick, UMO-history) a glacial geologist, (Dr. Harold Borns, UMO-geology), a producer of low cost measuring and sampling equipment (Mr. George Hahn, Acadia Institute of Oceanology, Seal Harbor, Maine), and personnel of the Maine Coastal Planning Office.

2. A Week of Travel (Week 2)

This week featured applied science and social science emphasizing the status of use of marine resources in Maine. Experiences provided opportunities for participants to gather photographic, interview and experiential records of the history of marine technology, industrial applications of fisheries, marine algae studies, development of aquaculture as well as direct experiences both shipboard and in the laboratory with DMR marine specialists. Sites in south-central Maine were utilized; most notably the Shore Village Museum (lighthouses) in Rockland, the Bath Iron Works (shipbuilding), the Bath (Maine) Maritime Museum and the DMR laboratories at Boothbay.

3. A Week of Field Work (Week 3)

The final week of the summer workshop was located in a "wilderness marine setting," the Robert S. Friedman Cobscook Bay Laboratory of Suffok University. The participants acquired or improved working skills in the areas of seamanship, navigation, collection and preparation of marine organisms for instructional use, as well as exploration of the water, currents, and marine geology of the area. Cruises and trips were oriented towards marine ecology as well as cetacean study, beach profiling, navigation, and physical oceanography. They were conducted on Cobscook Bay and Head Harbor Passage in Passamaquoddy Bay in eastern Maine. Both motor vessels and a 40-foot sailing vessel were used. In addition, excursions explored the social structure, economics, career patterns and industries of the region of Eastport, Maine. The Marine Trades Center of Washington County Vocational Technical Institute, Eastport; and the Huntsman Marine Laboratory of St. Andrews, New Brunswick, Canada were also visited.

4. Autumn Conferences

The participants assisted in the planning and presented talks at an all weekend conference for teachers from the Canadian Maritimes, Maine, and New Hampshire. These conferences were planned at a central Maine coastal location: Maine Maritime Academy, Castine, Maine. Those

attending these two-day conferences experienced lecture-demonstration and "hands-on" experiences. State recertification credit was available for those attending the conferences. Project staff provided for the overall organization and direction of each conference in cooperation with the conference planning committee of GOMMEA.

5. Local Workshops

The participants each conducted a minimum of one half-day workshop in their own school districts. These were planned for the period of the fall semester. These activities were supported by planning assistance from the project staff but were not conducted by the project staff. Staff attended approximately ten randomly selected workshops to provide a quality control assessment.

NOTES AND REFERENCES

1. This project was supported by the College Teacher Development in science program of the National Science Foundation. The appropriate grant numbers were:

1979 SPI-7902096
1980 SPI-8000119

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3. UMO (University of Maine at Orono is the state of Maine land grant and sea grant institution).

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B.S. DEGREE IN ENVIRONMENTAL EDUCATION: SLIPPERY ROCK STATE COLLEGE

by Craig C. Chase*

The undergraduate Environmental Education Program at Slippery Rock State College has received approval from the State of Pennsylvania to grant teacher certification. Course work is divided into four categories: environmental education, professional education, general studies, and electives. The program emphasized direct application of environmental knowledge with the public and cooperative field experiences are provided for students by a variety of environmentally-oriented agencies.

The College

Slippery Rock State College is a multi-purpose Pennsylvania state college with approximately 5,000 students. It is located about 50 miles north of Pittsburgh and 30 miles east of Youngstown, Ohio.

Goals and Philosophy

The development of the environmental education degree is offered as the means of achieving interdisciplinary, holistic values contributed by the academia of numerous departments of the college. The student is thus exposed to many environmental philosophies while being provided with an experiential background for decision making. Departments offering courses in the program are: biology, history, education, philosophy, park and recreation, counseling and educational psychology, physical education, chemistry, geology, business and geography.

The principal objectives of the undergraduate Environmental Education Program are: 1) the development of educators that have gone through a process designed to focus knowledge and feelings about their environmental components and, 2) to develop in students a technique repertoire that will allow them to provide group leadership as they aid others in finding out about their environment.

Courses provide a strong classroom program dealing with educational curricula while the college provides "land" for the direct application of learning such as the Jennings Environmental Education Center and area residental environmental study areas.

Dr. Chase is the Coordinator of the Environmental Education Program at Slippery Rock State College, Slippery Rock, PA 16057.

Curriculum

Course work is divided into four categories: environmental education, professional education, general studies and electives. Choices of one's general studies courses are designed to provide a broad introduction to the liberal arts as well as provide competencies in one's chosen field. Professional education courses are designed to promote one's ability to work with people in a variety of disciplines. Environmental education courses provide specific training to meet behavioral competency standards for environmental educators. Required courses are listed below:

A. General Studies
60-61 hours with the following highly recommended:

1.

Bio	105	Environmental Biology
Phil	124	Environmental Ethics
Bio	207	Land Plants
Econ	202	Principles of Economics II
Geol	141	Environmental Geology
Hist	445	Environmental Thought in the U.S.

2. In addition to the required courses for teacher preparation, you must demonstrate competencies in the complementary areas of art, music, health and safety education and physical education.

B. Professional Education

Educ	330	Educational Media and Technology	3
Educ	200	Orientation to Education	2
CEdP	349	Child Development	3
CEdP	242	Educational Psychology	3
Educ	380	History and Philosophy of Education	3
ElEd	362	Methods and Materials in Teaching Elementary Science	3
ElEd	282	Evaluation in the Elementary School	3
or			
ScEd	343	Evaluation Techniques in Secondary School	
			20

C. Environmental Education
Required Courses

EnvE	135	(Geog 135)	Intro to Environmental Problems
EnvE	150	(PkRc 150)	Exploring Our Environment
EnvE	235	(Geog 235)	Conservation of Natural Resources
EnvE	309	(PkRc 309)	Practicum in Environmental Education
EnvE	350	(PkRc 250)	Environmental Teaching
EnvE	450	(PkRc 450)	Environmental Education Administration and Planning
Educ			Student Teaching
			30

D. Electives
17-18 hours 17-18

Total Semester Hours 128

Cooperative experiences are provided for students by the Bureau of State Parks, U.S. Forest Service, U.S. Army, Corps of Engineers, National Park Service, area school districts, private camps and youth agencies.

Environmental Occupations of SRSC Environmental Educators

1. Elementary Teachers
2. Secondary School Teachers
3. School District E.E. Coordinators
4. School District Administrators
5. Community College Teachers
6. Private College Teaching
7. Environmental Interpretors
8. Forest Rangers
9. Federal Agency Employment:
   a. Corps of Engineers
   b. Soil Conservation Service
   c. National Park Service
   d. Forest Service
   e. Bureau of Land Management
   f. Youth Conservation Corps
   g. Cooperative Extention
10. Girl Scouts of America
11. Boy Scouts of America
12. Pennsylvania Bureau of State Parks
13. Pennsylvania Fish Commission
14. Pennsylvania Department of Environmental Conservation
15. Canada National Parks
16. Environmental Centers Staff

Businesses Owned and Operated by Graduates

1. Sales-Outdoor Equipment
2. Planning Consultant for Campground Owners
3. Survival Education Workshops
4. Environmental Centers
5. White Water Raft Guides
6. Organized Disposal Systems

Methods, Techniques and Procedures Utilized

Methods, techniques and procedures utilized in training professionals for the field of environmental education emphasizes direct application of knowledge with the public. As underclassmen, students apply classroom training by working with the public at a regional environmental center. Events such as an annual school district E.E. competition, workshops, monthly public programs and requests from schools provide the opportunities for E.E. majors to polish their expertise and expand their repertoire of techniques. By the time that they are ready for their practicum and student teaching, they have confidence in their ability and are secure about exercising leaderships perogatives.

Classroom training to meet the behavioral competencies for environmental educators requires that each graduate prepare an approved site plan for agency use, a funding proposal of their choosing, a total field program for a resident group, a researched land deed, a macro and micro view of national and world-wide environmental problems as well as pursue studies in the environmental emphasis they have chosen. Field use of specialized environmental equipment builds familiarity and competence. Major field trips each year include a trip to visit specific agencies and their programs. Recent trips visited federal agencies in Washington, DC, Williamsburg, VA, Harper's Ferry and Gettysburg.

Each year students are encouraged and offered an option of attending various professional meetings. The last meetings attended were the Association of Interpretive Naturalists, Pennsylvania Alliance for Environmental Education, New York State Outdoor Education Association, Pennsylvania Environmental Education Council, American Camping Association and the American Nature Study Society.

Evaluation and Research

The Pennsylvania Department of Education reviewed the environmental education program, personnel and facilities in 1978. The program was approved to grant teacher certification. In 1979, the National Recreation and Park Association reviewed the department housing the program and granted their approval. In 1980, as part of a competency based teacher

education project, graduates were invited to a one-day conference on campus. Curriculum suggestions and complaints were solicited. These suggestions were evaluated and curricular changes are now being implemented.

In 1981, the Middle States Association for Accreditation will be evaluating the program as part of a total college review.

In the last three years, professors from Australia, Canada and Japan have come to Slippery Rock to observe the program in action.

Future Program Plans

Slippery Rock State College has been active in obtaining foundation support for the program. One example of this is a project inviting major college and university environmental education programs from across the country to participate in writing the best possible program to train environmental educators. The end result of this project will be changes in the Slippery Rock undergraduate Environmental Education Program as well as the graduate degree (M.Ed.) which focuses on preparing program administrators.

For further information, contact the author.

SUMMER PROGRAM FOR TEACHERS IS ENVIRONMENTAL EDUCATION IN ACTION: UNIVERSITY OF NORTHERN IOWA

by Bernard L. Clausen*

Personal experience in the environment and with resource management practices has been the guideline for the University of Northern Iowa's in-service program. Currently the program consists of intensive three-week courses in Iowa's conservation problems and environmental education program development. In an effort to make the program more accessible to teachers, each course is offered in two different parts of the state during the summer months. Teams of teachers from a single school district are encouraged, and local resource people who are available throughout the school year assist with the instructional program. Cooperation of many agencies and groups is the foundation for a relevant program, a scholarship program, and post-program expansion of environmental education efforts.

Introduction

The 32-year-old summer Iowa Teachers Conservation Camp program continues to be a major change agent for environmental/conservation education. Over 2,000 participants from every county in Iowa and a few others from other states have completed at least one course of the program since 1950. Over the years the program has effectively responded to changes in curriculum, teacher needs, and environmental problems.

During its first decade the program strongly emphasized nature study and resource use. The three directors of the program from 1950 to 1957 had earned their doctorates under E. Laurence Palmer at Cornell University as had several of the early staff members. A high proportion of the early participants were teachers in the rural schools of Iowa. Through the second decade nature study remained a strong part of the program, but the emphasis evolved toward application of information to the making of resource management decisions in a societal context. These program modifications anticipated the advent of the environmental decade of the seventies.

The program originated under the joint sponsorship of Iowa State Teachers College (now the University of Northern Iowa), the Iowa Department of Public Instruction and the State Conservation Commission. These agencies have continued their sponsorship to the present. The Soil Conservation Districts along with other agencies and organizations have contributed greatly to the success of the program.

From 1950 to 1972 the program was in residence each summer at Springbook State Park where participants lived and studied in facilities of the State

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Conservation Commission. Declining enrollment in 1972 indicated a need to change from a residential program to a program which would travel to serve teachers in their home areas. As anticipated, significant advantages were gained by locating the program in two different areas each summer. The program became accessible to commuters who were unable to leave home for a residential camp. Course material was localized thus bringing about more relevant understanding and direct inclusion into the participant's school curricula. The teachers were introduced to local resource people upon whom they would depend throughout the year. A greater impact on curriculum has been achieved by having teams of teachers from a single school district attend.

Personal experience in the environment and with resource management practices has been the fundamental guideline for the program since its inception. A wide variety of techniques is used to provide experiences with teaching methodologies concurrently with subject matter coverage.

The program is currently composed of two courses. Each course involves three weeks for three semester hours of graduate-level credit. A field-oriented course in Iowa Conservation Problems is the direct descendant of the original course offered in 1950. An advanced course in Environmental Education Program Development is also offered.

Instructional Program

A generalized outline for the current course in Iowa Conservation Problems is presented in Table 1. It gives a common sequence of subject matter topics on a day to day basis. The class day is from 8:30 a.m. to 4:30 p.m. Local environmental issues frequently offer unique teaching opportunities, and the generalized outline is modified to incorporate them. For example, when the program is located in the forest region of Iowa, more emphasis is placed on forest industries and the ecology of forest management. If an original prairie is available, it is studied biologically as well as historically. When there is local controversy over urban land use, it is investigated.

The course sequence begins with local natural history, basic ecology and environmental awareness. These continue throughout the course as they are applied to natural resource use and management. Experience with resource use is extended to socioeconomic considerations in the applications of modern technology. Political controversies resulting from the decision-making process are explored and discussed.

The variety of action insures that participants experience the environmental education process at the same time they are learning facts and gaining a comprehensive understanding of their natural resource base. The emphasis is on learning from the environment rather than learning about the environment. Comments heard often throughout the course are: "I've lived here all my life, but I didn't know this was here." and "I've been here before many times, but I never noticed that." Having experienced the excitement of personal discovery, the participants understand its importance as a powerful motivating force. Alumni find it very difficult to slip back into a read and lecture style of teaching. A sixty-year-old

TABLE I

GENERALIZED OUTLINE FOR IOWA CONSERVATION PROBLEMS

Day 1	Registration and overview, Natural History Field Study
Day 2	Field identification and ecology of local plants and animals
Day 3	Geology of Iowa and mineral resources, field study of mineral industries and land reclamation
Day 4	Soil formation and land capability for urban and agricultural use, field study of soil types
Day 5	Soil conservation practices and Soil Conservation District programs, field study of a watershed
Day 6	Curriculum planning and experience with environmental education process
Day 7	Field study of forest management and wood utilization
Day 8	Field study of fish and wildlife management practices
Day 9	Using school sites as outdoor laboratories
Day 10	Practice in natural history and environmental interpretation
Day 11	Developing projects and programs for participants' schools, on-site visitations by program staff
Day 12	Participant reports, field study of aquatic communities
Day 13	Urban land-use simulation game, field study of urban community
Day 14	Air and water quality problems, energy education programs
Day 15	Political and legal aspects of environmental quality, review of environmental values and citizen responsibilities in decision making

teacher called the author one night about midnight to say that she could not sleep until she thanked the program for completely turning around her approach to teaching. She was having greater success and more enjoyment than she had experienced in years.

The generalized outline, however, reveals only part of the instructional program. The staff is constantly integrating subject material and pointing out different teaching techniques which could have been used. Adaptations of the material to various grade levels and subject fields are also discussed. Driving to field trip sites gives the opportunity for review and additional interpretation of the environment.

In any particular class group, teachers from kindergarten to senior high school levels will be present. Subject areas in which these teachers specialize will cover the breadth of the modern curriculum. The mix of backgrounds and expertise enhances learning and leads to greater appreciation of the contributions of everyone. This sets the stage for horizontal and vertical integration of a complete environmental education effort.

By using local resource people to assist with the instructional program, the teachers become introduced to individuals who can help them during the school year. Participants also become familiar with various career possibilities which can be communicated to their own students. Exposure is given to different value systems as participants, resource people and program staff interact. Such interaction is effective in clarifying values and recognizing inconsistencies in personal thinking. A list of agencies and other groups which assist with the instructional program is given in Table 2.

An environmental education resource center is established at each teaching site where participants make good use of printed materials provided by University of Northern Iowa and Department of Public Instruction. The collection includes field guides, textbooks, film lists, examples of environmental Title 4 projects, curriculum guides, samples of free and inexpensive teaching materials, kits, posters, etc. The resource center is heavily used before and after scheduled class times and during break periods.

Academic evaluation of participants is based on four factors: 1) Notebook completeness and utility as a classroom reference; 2) Oral presentation of an environmental teaching project which is ready for Fall implementation without further work; 3) Participation and personal involvement in the course; and 4) Success in direct and subtle oral quizzing by program staff. Too much material is presented too quickly to expect adequate synthesis for a written examination. Alumni have expressed that the synthesis occurs during the following school year as they use their notebooks for reference.

The advanced course in Environmental Education Program Development is restricted to those who have taken Iowa Conservation Problems or who have acquired a similar background elsewhere. It was found that teachers who take the first course try incorporating the concepts and methodologies into their own classes. After several years of doing this, they are

TABLE 2

AGENCIES AND ORGANIZATIONS PROVIDING INSTRUCTIONAL ASSISTANCE

1975-1980

Federal Agencies

- Soil Conservation Service
- Army Corps of Engineers

State Agencies and Organizations

- University of Northern Iowa
- Cooperative Extension Service, Iowa State University
- State Conservation Commission
- Iowa Department of Public Instruction
- Iowa Department of Environmental Quality
- Iowa Geological Survey
- Iowa Bureau of Mines and Minerals
- Izaak Walton League
- Iowa Ornithologists Union
- State Legislators

Local Agencies and Organizations

- Soil Conservation Districts
- County Conservation Boards
- City, County and Regional Planning Agencies
- Sewage Treatment Plant Operators
- Water Treatment Plant Operators
- City Park Departments
- Manufacturing Industries
- Mineral Industries
- Forest Industries
- Farmers

ready for the opportunity to pursue major revisions of their curricula to bring about a more complete application of the environmental education process. The advanced course makes available the incentive, the references and the experience of the program staff. A number of the environmental education programs developed by participants in this course have been published by local school districts and area education agencies as suggested guides to other teachers.

Joint Sponsorship and Cooperation

The program has been a cooperative effort since its inception. The involvement of conservation-related agencies and organizations has provided strength and continuity to the courses as well as follow-up with the participants.

The original 1950 program was the result of a shared concern to educate teachers in the use of a 1949 handbook on the teaching of conservation published by the Department of Public Instruction. The concept of the program took shape in discussions between Miss Jessie Parker, Superintendent of Public Instruction; Mrs. Addison Parker, State Conservation Commissioner; Cyrus Lantz, Head of the Department of Science at Iowa State Teachers College (University of Northern Iowa); Gilbert Mouser, Professor at I.S.T.C. and George Worley, Chief of the Education Division of the State Conservation Commission. An advisory committee was quickly formed which included representatives from the following agencies: Public Instruction, Conservation Commission, Natural Resources Council, State Soil Conservation Committee, County School Superintendents, Extension Service, and Iowa State Teachers College.

Through the early years the advisory committee was expanded to include other groups which joined in supporting the program. With the teacher training program well established after four years, the advisory committee agreed that additional efforts needed to be made to further conservation education in Iowa schools. In 1955, the Iowa Teachers Conservation Camp advisory committee became the Iowa Conservation Education Council, Inc. The Council continues to provide leadership and support in many ways to environmental/conservation education in Iowa.

Being involved at the beginning gave each of the cooperating agencies a strong sense of identification with the program and a feeling of responsibility for its success. The tradition continues in the manner in which each session of the program is currently organized. Responding to an identification of need and interest in an area, the program director meets with local representatives of the cooperating agencies. Local environmental problems, issues and potential field trip sites are identified. Responsibilities are accepted for local publicity, scholarship fund raising, inviting resource persons, field trip arrangements and local classroom facilities. The enthusiasm of these local groups is contagious and significant in recruiting participants. Frequently these groups find that working together on hosting the program leads to other cooperative projects.

Financial Assistance Program

The scholarship program has been highly significant in attracting participants and in forming a bond between donors and recipients. The majority of the funds are raised locally by Soil Conservation Districts. Other local groups are also active contributors, and a listing of these is given in Table 3.

The local funds are supplemented by dedicated endowment funds placed with the Soil Conservation Society of America and also with the University of Northern Iowa. The Federated Garden Clubs of Iowa make an annual contribution to the scholarship fund.

In the early years of the program, most scholarships covered tuition with some being large enough to also pay for meals and lodging. As teacher salaries rose to a more adequate level, it became possible to hold scholarship amounts constant while tuition costs increased. At present, scholarship awards normally pay half of the tuition. Many teachers have indicated that they would not have participated in the program without a scholarship. Apparently, the receipt of a scholarship eliminated the last resistance to enrolling. The reaction of many participants is that "if this program is so important to people in the community that they are willing to assist me, perhaps I should attend." All participants are made aware that the scholarships are not gifts but instead are investments in improved instruction with dividends expected annually. Many scholarship donors invite recipients to present a report on the program and how they are using it in their teaching. From such relationships active county environmental/conservation committees have developed to form a mutual support group of teachers and community people.

Insights Gathered From Experience

A consortium of sponsoring agencies providing assistance in course organization, instruction and administrative support is valuable. A written agreement should be drafted to detail responsibilities, and the agreement should be reviewed annually.

The enthusiasm for environmental/conservation education generated in the participants brings consulting and correspondence demands on the program staff throughout the year. Contacts with alumni at professional meetings and workshops need to be as frequent as possible. Alumni must not be abandoned after they complete the course. After all, they are the best sales force a program could have.

Elementary, secondary and college teachers from any subject field become a unified group in an action type course where individuals learn on their level to reach their personal goals. A mix of backgrounds in the participant group enhances learning and improves communication.

A symbol or trademark for the program gives special identity. The turtle was adopted by the participants in the first Iowa Teachers Conservation Camp and all participants and alumni are known as turtles. In environmental/conservation education, teachers must be willing to "stick their necks out" and work patiently and persistently.

TABLE 3

LOCAL GROUPS PROVIDING SCHOLARSHIP FUNDS

Soil Conservation Districts

Chapters of the Izaak Walton League of America

Affiliates of Iowa Wildlife Federation

Women's Clubs

Kiwanis Clubs

Banks

Farm Equipment Dealers

Garden Clubs

Concerned Individuals

Priorities and capabilities of cooperating agencies and organizations change over time. The program staff must constantly seek to broaden the support base for the program.

Evidence of Success

Although no formal evaluation of the impact on individual classrooms has been conducted. informal visits and conversations indicate a significant increase in effective environmental/conservation teaching among alumni.

A sampling of the letters received after completion of the basic course reveal the following types of comments: "My experiences in the program were exciting and very instructive. It is helping me in my teaching this year," a high school science teacher. "There are many indoor and outdoor activities I have done as a direct result of the program," upper elementary teacher. "I am more confident now because I have more knowledge of the subject matter," lower elementary teacher. "I have been teaching a number of years, but I received a new approach for reaching my children," upper elementary teacher. "A direct offshoot of the program is the building of an outdoor classroom on the school site," high school teacher.

At workshops and professional meetings such as the Iowa Conservation Council, the Iowa Science Teachers Association and the Iowa Academy of Science, alumni are usually found presenting papers on their innovations in environmental/conservation education. Many alumni request opportunities in the in-service training programs of their school districts to present their newly gained knowledge and enthusiasm.

A majority of the winners in the Teachers Awards Program of the Iowa Conservation Education Council have been alumni of the program, and several alumni have assumed state leadership roles on the Council.

Alumni have been active in forming and serving on county environmental/conservation education committees and some have been appointed assistant commissioners by Soil Conservation Districts to give leadership in educational programs. The environmental education consultant for the Iowa Department of Public Instruction is an alumnus. An unknown number of alumni have been motivated to earn master's degrees in environmental education and at least one has earned the doctorate.

Many school camping programs and outdoor laboratories throughout Iowa owe their initiation to alumni of the program. An outstanding elementary program in Wisconsin has been developed by an alumnus. Secondary courses in conservation, environmental studies, and ecology are now being taught by alumni.

For 31 years participants in the Iowa Teachers Conservation Camp program have had an excellent record in implementing environmental/conservation education into Iowa Schools. The program remains flexible and sensitive to changes in education and in society as a whole. The dynamic evolving character of the program has permitted it to become a leading disseminator of new developments in environmental/conservation education.

An example of the recognition accorded the program is a centennial award given in 1975 by the Iowa Academy of Science as part of the observance of the 100th anniversary of the Academy. The citation reads: "Iowa Teachers Conservation Camp, Bernard L. Clausen, director: For championing the cause of conservation and conservation education long before it became a popular idiom; For introducing hundreds of Iowa teachers to know and appreciate their environment and inspiring them to transmit to their students this knowledge and appreciation; For working with an introducing Iowa teachers to various conservation agencies serving the people of Iowa."

AN INTERDISCIPLINARY ENVIRONMENTAL EDUCATION WORKSHOP FOR TEACHERS: MICHIGAN STATE UNIVERSITY

by Martin Hetherington*

In-service workshops to assist teachers in keeping abreast of recent environmental and energy legislation and the reactions of industry and the general public are conducted by the Science and Mathematics Teaching Center at Michigan State University. Participants are exposed to current environmental issues, then develop appropriate activities for classroom use.

This workshop is co-sponsored by the Science and Mathematics Teaching Center at Michigan State University and American Society for Environmental Education (ASEE) in connection with its Natural Environmental Education Institute Program. The Institute includes a consortium of colleges and universities throughout the United States and is comprised of Michigan State University, University of Michigan, Rutgers University, University of Tennessee, University of Massachusetts, and University of California.

The American Society for Environmental Education was founded in 1971 to answer the need for a national professional organization for environmental educators at all levels from primary school through graduate university studies. The ASEE is also committed to out-of-school and adult environmental education programs and to work actively with the business community to ensure environmental literacy for all citizens, young and old and to the Nation's working force both blue and white collar. The headquarters of the ASEE is located at the University of New Hampshire, 33 Mill Road, Box R, Durham, NH 08324. Dr. William Mayo is President of ASEE.

The Science and Mathematics Teaching Center at Michigan State University was founded in 1957 to aid in improving the quality of instruction in science and mathematics education in the schools of Michigan. The Science and Mathematics Teaching Center is involved in programs of preservice instruction, inservice instruction, research on teaching and learning, and service to schools of Michigan. In 1970 Dr. Martin Hetherington came to SMTC to develop an environmental education program. The SMTC is located in McDonel Hall, Michigan State University. Dr. James Joseph Gallagher is the Director.

The workshops were conducted during the summers of 1979 and 1980. A sample program is included as an Appendix. The purpose of the workshops were to assist teachers in (1) learning about recent environmental and energy legislation and the responses which have been made by industry and society,

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and (2) formulating appropriate educational activities for students concerning these important environmental and energy issues. Emphasis was placed on a balanced understanding of these issues which confront people in Michigan and other parts of the nation.

Representatives of governmental agencies which enforce the legislation, business and industry which must respond to it, and public interest groups which voice the concerns of the general populace each present their objectives, and the constraints under which they work, on selected issues including toxic substances, transportation, fuel shortages, and nuclear power generation. People representing agriculture, business, industry, government, recreation, and consumer advocacy groups were among the presenters during the workshops.

In general, mornings were devoted to seminars on selected topics with speakers presenting a range of viewpoints on key issues. The participants had ample opportunity for questioning and discussion. Afternoons were devoted to discussion of the educational importance of these issues and to formulation of instructional material that could be used with the students in the participants' schools.

Fieldtrips were also part of the workshop schedule (see schedule included).

Each participant received a stipend and three graduate credits upon completion of the workshop. The workshop was funded by various Michigan industries.

This year's workshop will be held at Michigan State University during the summer of 1981. For more information contact the author.

APPENDIX: SMTC-ASEE ENVIORNMENTAL EDUCATION WORKSHOP

1980 LIST OF SPEAKERS, TOPICS, AND FIELD TRIPS

Monday, August 11

Lynn Jondahl	State Representative
Topic	Toxic Waste Legislation

Tuesday, August 12

A.M.	Open at This Time
P.M.	Field Trip: Applegate Insulation Plant (1:00-2:30) Ingham County Care Facility (Solar Project, 2:30-3:30)

Wednesday, August 13

Al Taylor	General Motors Corporation, Automobile Emissions Engineer
Arthur Howland	Ford Motor, Product Safety

Thursday, August 14

Walter Kress	Shell Oil Co.
P.M.	Field Trip: M.S.U. Ponds

Friday, August 15

Wayne Schmidt	Staff Ecologist, Michigan United Conservation Clubs

Monday, August 18

Don Inman	Environmental Enforcement, Department of Natural Resources
P.M.	Field Trip: Urban Options (1:00-2:15)

Tuesday, August 19 Open at This Time

Wednesday, August 20

A.M.	Field Trip: Visit to Midland Nuclear Plant
P.M.	Field Trip: Visit to Dow Toxicology Lab

Thursday, August 21

Dr. William Taylor	Governor's Science Advisor
Alex Sagedy	American Lung Association

Friday, August 22

Paul C. Hittle	Director of Environmental Activities, Consumers Power Company

ENVIRONMENTAL EDUCATION PROGRAMS: UNIVERSITY OF VERMONT

by Thomas R. Hudspeth*

Undergraduate students interested in pursuing environmental education at the University of Vermont many choose from three options: 1) a major in elementary education with a concentration in environmental studies, 2) a major in secondary education with a broad-field teaching major in environmental studies, 3) or a self-designed major in environmental studies. A graduate option in environmental studies is offered through the Master of Education program, with an individually designed concentration in professional education and curriculum development.

The Environmental Program was established at the University of Vermont (UVM) in 1972 to provide a university-wide course of studies in Environmental Studies. Its courses and curricula, which include both a self-designed major and a coordinate major, were approved by all undergraduate colleges and schools: College of Arts and Sciences; College of Engineering, Math and Business Administration; College of Education and Social Services; College of Agriculture; School of Natural Resources; and School of Home Economics (which has recently been dissolved). The Environmental Program views environmental education as an integral part of its mission, and has demonstrated its commitment to train undergraduate and graduate students to become environmental education practitioners by providing several options:

1. In cooperation with the College of Education and Social Services, a major in elementary education with a concentration in Environmental Studies or in secondary education with a broad-field teaching major in Environmental Studies.

2. A self-designed major in Environmental Studies with a focus on the student's particular interests in environmental education, and

3. in cooperation with the College of Education and Social Services, a Master of Education program with a focus on environmental education.

Undergraduate

Undergraduate students at UVM interested in environmental education have to decide whether or not they wish to be certified as public school teachers.

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Those who choose to be certified enter pre-service teacher training programs in the College of Education and Social Services in either elementary education with a concentration in Environmental Studies or secondary education with a broad-field teaching major in Environmental Studies (see figures 1 and 2). If they complete either of these programs, they achieve accreditation by the National Council for Accreditation of Teacher Education (NCATE) and the Vermont Department of Education, with reciprocal certification in thirty-nine states and the District of Columbia.

It is recommended, but not required, that elementary education students use electives to build an area of concentration. There are numerous single field concentrations, five combination areas (Environmental Studies, Social Science, Behavioral Science, Humanities, and General Science), and five specialty areas (Primary Experience, Early Childhood and Human Development, Reading and Language Arts, Bilingual-Bicultural Education, and Special Education). A major in elementary education with a concentration in Environmental Studies constitutes a major in elementary education and a coordinate major in Environmental Studies.

The 24 or more hours of advanced environmentally-related courses which the student selects while participating in ENVS 51: Major Seminar and which constitute that student's Individually-Designed Program, generally include ENVS 294: Environmental Education; RM 155: Environmental Interpretation; courses in general psychology, learning and human development, and environmental psychology; and content courses in natural sciences and natural resources, social sciences, and fine arts and humanities.

Self-designed major students with interests in environmental education generally pursue a supervised internship or field-based-learning experience for their ENVS 202: Senior Thesis Project. The Environmental Program staff have established close working relationships with numerous environmental education organizations and agencies in Vermont and New England, and the students generally have no difficulty arranging a satisfactory situation for an internship experience.

Figure 4 lists some of the major agencies, organizations, programs, and sites where students have engaged in internships related to their environmental education goals since the inception of the Environmental Program.

Comments on Undergraduate Options

The Vermont Department of Education does not recognize Environmental Education or Environmental Studies as a subject area for teacher certification. As a result, an elementary education major with a concentration in Environmental Studies or a secondary education major with a broad-field teaching major in Environmental Studies ends up classified by the Vermont Department of Education in such categories as "Natural Science" or "Social Studies". No concerted efforts have been made by staff of either the Environmental Program or College of Education and Social Services at UVM to change this situation because: 1) their goal is to have teachers "environmentalize" all subject areas, or integrate environmental concerns into all disciplines and areas of the curriculum rather

than treat Environmental Studies as a distinct subject matter or content area, and 2) within Vermont, the only "full-time" environmental educators in public schools are an environmental education coordinator for the Hartford schools (elementary, middle, and high) and the director and two assistant directors of the Montpelier Environmental Education Program (MEEP), an elementary school program. Furthermore, this state of affairs is not likely to change in the near future. All other teachers in the state who consider themselves environmental educators, integrate environmental concerns into science, math, social studies, reading and language arts, physical education, art, and other disciplines.

Students considering a major in elementary or secondary education at UVM are consequently told that there will probably be little likelihood of their being hired as a full-time Environmental Education or Environmental Studies teacher at a school or coordinator or consultant for an entire school district or consortium of districts.

Perhaps because of the situation mentioned above, there have been very few students at UVM in environmental education who have decided to go the route of certification programs: three per year, on the average. Most of those graduates are currently employed as teachers in public and private schools in Vermont and throughout New England. While these programs will remain on the books, they will not be promoted widely or pushed extensively, and it is doubtful that many more than the current number of students will pursue these options.

Students who choose the self-designed major in Environmental Studies as the route for pursuing their interests in environmental education claim there are several reasons for selecting this option:

1. they feel the certification program is too highly structured and restrictive (especially the abundance of "methods" courses for elementary education majors);

2. they (or their parents or peers or high school guidance counselors) feel a B.S. degree in Education is an inferior degree;

3. they like the flexibility and personal responsibility of the Environmental Studies self-designed major;

4. they see themselves utimately becoming an environmental education practitioner in a setting other than a public or private school or with a client group other than 5-18 year old children. In pre-course surveys in the ENVS 294: Environmental Education class, self-designed majors have identified a variety of non-formal education positions/situations in which they would like to be environmental education practitioners (see Figure 5).

Several of the self-designed majors with interests in environmental education have subsequently gone to graduate schools (University of Michigan, Cornell University, University of Wisconsin, Indiana University, University of Colorado, UVM, etc.) to further their studies. Most of the others have gained employment in positions related to their training. In many cases, their first job offers came from agencies or organizations with which they had internships or summer jobs. Staff at the UVM Center for Career Development say they find this is true in most other fields as well. The numbers of students opting for a self-designed major in Environmental Studies as the means for following their interest in environmental education have been about ten per year. Presently no plans are being made either to increase or decrease that number, but to continue to offer support and guidance for students seeking this approach. It is anticipated that the numbers will remain more or less the same in the future.

Graduate

Graduate students at UVM interested in environmental education pursue their interests through the Master of Education Program with an Individually-Designed Concentration in the Professional Education and Curriculum Development Department of the College of Education and Social Services. This program area is designed to develop leadership in such education fields as teaching, curriculum, and research for elementary and secondary school teachers as well as those with teaching roles in human service agencies.

Minimum degree requirements are: eighteen hours in courses in Education numbered above 200, including a minimum of six graduate hours in the foundations of education, and twelve additional hours in approved courses or six additional hours and thesis research. The Environmental Program staff work closely with graduate students in selecting the twelve hours in approved courses.

Comments on Graduate Option

The graduate option in environmental studies at UVM is intended primarily for Vermont residents holding professional positions in education and social services. Only three of the twelve graduates have been full-time graduate students; the rest were all teachers who took evening division and summer session classes over a period of several years. Thus the program does not have the critical mass of graduate students or selection of courses of some of the better known programs (e.g. University of Michigan, Ohio State University, Cornell University, etc.), but represents an attempt to meet the needs of Vermont teachers desiring a background in environmental education. No attempts are made to attract non-Vermonters because 1) the faculty involved are busy enough with the existing undergraduate and relatively few graduate students and 2) the high rate of tuition for out-of-state students and scarcity of graduate fellowships at UVM would make it difficult to lure non-residents to Vermont even if the university wanted to.

Figure 1

MAJOR IN ELEMENTARY EDUCATION WITH A CONCENTRATION IN ENVRIONMENTAL STUDIES

COLLEGE OF EDUCATION AND SOCIAL SERVICES AND ENVIRONMENTAL PROGRAM, UNIVERSITY OF VERMONT

General Education: minimum of 60 credits from the following five general areas, with at least one course selected from each area and taken for a letter grade. Specific requirements for certification, University requirements such as physical education, and requirements for the area of concentration may be used to satisfy general education requirements.

I Arts and Letters Area

a. English
b. Communication & Theatre
c. Art
d. Music
e. Classics

II Science and Mathematics Area

a. Biology
b. Zoology
c. Botany
d. Chemistry
e. Physics
f. Geology
g. Mathematics
h. Statistics
i. Computer Science
j. Environmental Studies

III Social Science Area

a. Anthropology
b. Political Science
c. History
d. Economics
e. Geography
f. Sociology
g. Psychology

IV Humanities Area

a. Philosophy
b. Religion
c. Foreign Language

V Health & Physical Education Area

a. Physical Education Activities
b. Physical Education Methods
c. Health Education

Specific General Education Requirements

		Minimum Credit
	English	6
COM 11	Effective Speaking or COM 14:Small Group Communication or THE 5:Oral Interpretation of Literature	3
MUS 111	Music for Elementary Teachers	3
ART 2	Basic Drawing or ART 3:Two Dimensional Studies or ART 4:Three Dimensional Studies	3
MATH 15, 16	Fundamental Concepts of Elementary School Mathematics	6

Figure 1 (continued)

HIST 7 or 8	History of the United States	3
PSCI 21	American Political System	3
GEOG 1	Introduction to Geography or GEOG 2:World Natural Environments or ANTH 21:Human Cultures or ANTH 26:Physical Anthropology	3
EDPE 46	Health Education	3
EDPE 100	Teaching Physical Education in the Elementary School	3

Professional Education

EDSS 2	Foundations of Education	3
EDSS 145, 146	Learning and Human Development	6
EDEL 144	Teaching Science and Social Studies	3
EDEL 160	Teaching Mathematics and Critical Thinking in the Elementary School	3
EDEL 121	Reading and Language Arts	3
EDEL 134	Children's Literature and Language Arts	3
	Reading Elective	3
EDEL 181	Student Teaching	8-12
EDSS 190	Approaches to Education	3

Concentration in Environmental Studies

ENVS 1, 2	Introduction to Environmental Studies	8
ENVS 100	Environmental Theory	3
ENVS 204	Seminar in Environmental Studies	3
ENVS 294	Environmental Education	3
	At least 13 credits of environmentally-related courses, including at least two advanced courses	13

Minimum of 127 credits required for graduation,with no more than two credits of Physical Education Activities.

Figure 1 (continued)

To be certified in secondary teaching, a student must have a teaching major with at least 30 credits and a teaching minor with at least 18 credits, or a broad-field teaching major with at least 48 credits. There are numerous teaching majors and minors and three broad-field teaching majors: 1) Environmental Studies, 2) Natural Science, and 3) Social Studies. A major in secondary education with a broad-field teaching in Environmental Studies constitutes a major in secondary education with a coordinate major in Environmental Studies.

Figure 2

MAJOR IN SECONDARY EDUCATION WITH A BROAD-FIELD TEACHING MAJOR IN ENVIRONMENTAL STUDIES

COLLEGE OF EDUCATION AND SOCIAL SERVICES AND ENVIRONMENTAL PROGRAM, UNIVERSITY OF VERMONT

General Education: minimum of 60 credits from the following five general areas, with at least one course selected from each area and taken for a letter grade. Specific requirements for certification, University requirements such as physical education, and requirements for the broad-field teaching major may be used to satisfy general education requirements.

I Arts and Letters Area

a. English
b. Communication & Theatre
c. Art
d. Music
e. Classics

II Science and Mathematics Area

a. Biology
b. Zoology
c. Botany
d. Chemistry
e. Physics
f. Geology
g. Mathematics
h. Statistics
i. Computer Science
j. Environmental Studies

III Social Science Area

a. Anthropology
b. Political Science
c. History
d. Economics
e. Geography
f. Sociology
g. Psychology

IV Humanities Area

a. Philosophy
b. Religion
c. Foreign Language

V Health & Physical Education Area

a. Physical Education Activities
b. Physical Education Methods
c. Health Education

Specific General Education Requirements

		Minimum Credit
	English	6
COM 11	Effective Speaking or COM 14:Small Group Communication or THE 5:Oral Interpretation of Literature	3
	Science or Math Elective	3
HIST 7 or 8	History of the United States	3
PSCI 21	American Political System	3

Figure 2 (continued)

PSYC 1	General Psychology	3
	Humanities Elective	3
	Physical Education Activities	2

Professional Education

EDSS 2	Foundations of Education	3
EDSC 15	Participation	2
EDSS 145, 146	Learning and Human Development	6
EDSC 178	Secondary Methods and Procedures	3
EDSC 179	Secondary Methods and Procedures in Special Subject Areas	3
EDSC 181	Student Teaching	8-12
EDSS 190	Approaches to Education	3

Broad-Field Teaching Major in Environmental Studies

ENVS 1, 2	Introduction to Environmental Studies	8
ENVS 100	Environmental Theory	3
ENVS 204	Seminar in Environmental Studies	3
ENVS 294	Environmental Education	3
	At least 31 credits of environmentally-related courses, including at least two advanced courses	31

Minimum of 124 credits required for graduation, with no more than two credits of Physical Education Activities.

The Environmental Program staff work closely with students in selecting the environmentally-related courses needed for their area of concentration or broad-field teaching major in Environmental Studies.

Those undergraduate students at UVM interested in environmental education who opt not to seek teacher certification complete a self-designed major in Environmental Studies (see Figure 3) with a focus on their particular interests in environmental education. Such students are generally enrolled in the School of Natural Resources, College of Arts and Sciences, College of Agriculture, and College of Education and Social Services.

Figure 3

SELF-DESIGNED MAJOR IN ENVIRONMENTAL STUDIES

ENVIRONMENTAL PROGRAM, UNIVERSITY OF VERMONT

Core Program

		Credits
ENVS 1, 2	Introduction to Environmental Studies	8
ENVS 100	Environmental Theory	3
ENVS 204	Seminar in Environmental Studies	3

Major Program

ENVS 51	Major Seminar	3
ENVS 201	Research Seminar	3
ENVS 202	Senior Thesis	6 (minimum)

Individually-Designed Program

(Planning and selection of courses accomplished as a course project in ENVS 51, including at least 24 hours of advanced environmentally-related courses).

+24

College or School Distribution Requirements

Electives

Figure 4

INTERNSHIP SITES FOR SELF-DESIGNED MAJORS IN ENVIRONMENTAL STUDIES WITH INTERESTS IN ENVIRONMENTAL EDUCATION
ENVIRONMENTAL PROGRAM, UNIVERSITY OF VERMONT
1972-1980

Vermont

Center for Northern Studies, Wolcott
Conservation Society of Southern Vermont, Townsend
Discovery Museum, Essex Junction
East Hill Farm and School, Andover
Fairbanks Museum of Natural Science and Planetarium, St. Johnsbury
Farm and Wilderness Camps, Plymouth
Gardens-For-All, Burlington
Grass Roots Project, Craftsbury Common
Green Mountain Audubon Nature Center, Huntington
Green Mountain Club, Montpelier
Green Mountain National Forest, Rutland
Hulbert Environmental Education Center, Fairlee
Keewaydin Environmental Education Center, Salisbury
Killington Adventure Program, Killington
Lake Champlain Basin Project, Burlington
Lake Champlain Committee, Burlington
Merck Forest, Rupert
Missisquoi National Wildlife Refuge, Swanton
Planned Parenthood of Vermont, Burlington
Shelburne Farm Resources, Shelburne
Smokey House Project, Danby Four Corners
Vermont Agency of Environmental Conservation, Montpelier
Vermont Chapter of the Nature Conservancy, Montpelier
Vermont Department of Education, Montpelier
Vermont Department of Fish and Game, Montpelier
Vermont Department of Forests, Parks and Recreation, Montpelier
Vermont Institute of Natural Sciences, Woodstock
Vermont Natural Resources Council, Montpelier
Vermont Public Interest Research Group, Montpelier
Vermont Tomorrow, Montpelier
Vermont Women's Health Center, Burlington
Wilderness Experience Program, UVM, Burlington
Zero Population Growth, Burlington

Massachusetts

Camp Grotonwood, Otter Lake Conservation School, Groton
Cape Cod Museum of Natural History, Brewster
Children's Museum, Williamstown
Elbanobscot Foundation, Sudbury
Habitat Institute for the Environment, Belmont
Historic and Urban Environmental Studies, Boston

Figure 4 (continued)

Lowell National Historic Park, Lowell
Massachusetts Audubon Society, Lincoln
New England Aquarium, Boston
New England Wildflower Society, Framingham
Ponkapoag Outdoor Education Center, Canton
Thompson Island Education Center, Boston

New Hampshire

Appalachian Mountain Club, Pinkham Notch
Camp Union, Otter Lake Conservation School, Greenfield
Nature's Classroom, Ware
Regional Center for Educational Training, Hanover
Sargent Field Camp, Peterborough
Squam Lake Science Center, Holderness
White Mountain National Forest, Laconia

New York

Brooklyn Botanical Garden, Brooklyn
High Rock Park Conservation Center, Staten Island
Sloop Clearwater Project, Poughkeepsie
Wave Hill Center for Environmental Studies, Bronx

Rhode Island

W. Alton Jones Field Campus, West Greenwich

Maine

Acadia National Park, Bar Harbor
Hurricane Island Outward Bound School, Rockland
Maine Audubon Society, Falmouth

Other

Chesapeake Bay Environmental Center, Edgewater, MD
Sanborn Western Camps, Florissant, CO
Programs throughout the country offered by the Student Conservation Association, Inc.; Environmental Intern Program; Atlantic Center for the Environment; and federal agencies such as the National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service. Also summer camps throughout New England and the rest of the U.S.

Figure 5

ENVIRONMENTAL EDUCATION PRACTITIONERS IN THE FORMAL AND NON-FORMAL EDUCATION SECTORS

Formal Education Sectors

1. Pre-service and in-service teachers of all subject areas in public schools, private schools, alternative schools, colleges, and universities

   pre-school, elementary, secondary, post-secondary, special education, physical education

2. Administrators (principals, superintendents, etc.), school board members, PTA members, adult educators, and continuing education personnel

Non-Formal Education Sectors

1. Human-service educators working in corrections institutions, mental institutions, day care centers, community education programs, population counseling programs and family planning clinics, etc.

2. Youth group leaders/staff, recreation leaders/staff, outdoor group leaders/staff:

   4-H, FFA, FHA, Boy Scouts, Girl Scouts, Campfire Girls, Boys' Club, YMCA, YWCA, youth centers, summer camps, church groups, town recreation programs, school recreation programs, outing clubs, Outward Bound, National Outdoor Leadership School, Project Adventure, Challenge Program, Wilderness Experience, Sailing Education Association, Student Conservation Program, Youth Conservation Corps, Green Mountain Club, Appalachian Mountain Club, bicycling and canoeing groups, etc.

3. Staff for environmental education centers, residential outdoor education centers

4. Staff for nature centers, interpretive centers, museums, aquaria, botanical and zooological gardens, arboreta, living history farms, historic sites, parks, forests, wildlife refuges

5. Extension Service agents

6. Information and education specialists for natural resource/environmental agencies

7. Mass communications personnel

8. Resource managers

9. Government officials and decision-makers

10. Community leaders

11. Private sector environmental group leader and members

12. Environmentally-concerned and active citizens

13. Parents

ENVIRONMENTAL EDUCATION IN THE C.I.M. DEPARTMENT: SOUTHERN ILLINOIS UNIVERSITY AT CARBONDALE

by Harold R. Hungerford and Audrey N. Tomera*

Although the State of Illinois has no formal certification for environmental education, Southern Illinois University at Carbondale offers concentrations and/or specializations in environmental education at all degree levels. Undergraduate students in education may elect a subspeciality in environmental education; graduate students may choose a concentration in environmental education. Research thrusts are numerous, and a unique relationship between faculty and graduate students actively involves students as contributing professionals.

The Department of Curriculum, Instruction, and Media (C.I.M.) at Southern Illinois University at Carbondale (SIU-C) offers opportunities for environmental education specialization at all professional degree levels. Because Illinois offers no teacher certification in environmental education, such specialization at the undergraduate level must be infused into existing programs, e.g., general elementary education, secondary science education, social studies education, etc. At the graduate degree level, however, the environmental education specialty gains greater significance, permitting the student to choose an environmental education specialty as a part of a degree program in either elementary or secondary education. Due to the nature of the C.I.M. departmental mission, much of the professional environmental education is geared toward formal receiver groups although, during the past year or two, increasing emphasis has been placed on nonformal environmental education.[1]

The Undergraduate Program-Elementary

Every elementary education major at SIU-C has the option of electing a subspecialty during the baccalaureate program, e.g., science, environmental education, language arts, etc. Such subspecialties involve utilizing elective hours, usually a minimum of eight semester hours. A variety of courses are recommended to undergraduates interested in the environmental education specialization including Fundamentals of Environmental Education (Forestry 401), Workshop in Environmental Education (CIM 498) and Natural Resources Planning (Geography 424). Although the undergraduate elementary major has little opportunity to gain depth in either cognate or methods courses, those interested in environmental education can initiate a professional commitment which can be consummated in depth at the graduate

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degree level. Further, a wise selection of courses at the undergraduate level allows the newly certified teacher to infuse environmental education into elementary classrooms in Illinois.

The Undergraduate Program-Secondary

As noted earlier, the State of Illinois offers no certification for environmental education. Therefore, secondary majors interested in environmental education must somehow weave an environmental education specialty into an existing, approved content area. A goodly number of science majors choose to do this utilizing electives approved in their particular major or voluntarily increasing their elective burden in order to accomplish the environmental education goal. Students choosing to become certified for the teaching of general science can obtain a significant selection of courses which are approved by the State of Illinois for that purpose. Among those which are environmentally appropriate are Environmental Geology (Geol. 478), Environmental Interpretation (Forestry 423), and Solar and Alternative Energy Plans (Geog. 435). In addition, an option exists for the undergraduate to serve an environmental internship at the SIU-C Touch of Nature Environmental Center. Such an internship would involve direct interaction with school groups at the Center. Students opting for such an internship would typically spend 15 to 45 hours working at the Center under the direction of Jerry Culen, the Director of Environmental Programs.

Masters Degree Programs

In the Department of C.I.M., students choosing the Masters Degree with a concentration in environmental education have two programmatic options from which to choose. One of these is to work toward the degree via the elementary education programmatic route. The other is the secondary education route.

The exact dimensions of the Masters Degree depend both upon advisor and programmatic area chosen. Typically, however, about one-half of the course work is related directly to appropriate cognate courses and/or professional environmental education courses. Cognate courses suitable to such a degree program are available through Forestry, Geology, Geography, Botany, Zoology, and Agriculture. Every effort is made to select courses that best represent the candidate's professional goals and academic/experiential background. Every candidate is responsible for taking a research methods course, a research tool course, and conduct environmentally-related research which would culminate in either a research paper or a thesis. The number of professional education courses required depends upon the programmatic area with elementary education offering slightly greater flexibility.

Typically, the Masters student is also eligible for numerous workshops, practicums, and independent study opportunities. It is not at all unusual for the graduate student to intern in either a public school setting or at the SIU-C Touch of Nature facility.

Professional environmental education course offerings within the C.I.M. Department itself include Workshop in Environmental Education (CIM 498), Foundations of Environmental Education (CIM 509), Seminar in Environmental Education (CIM 585), Individual Research in Environmental Education (CIM 593), Environmental Education Practicum (CIM 594), and Environmental Education Internship (CIM 595).

The Ph.D. Programs

The Ph.D. programs, like the Masters programs, operate through either the elementary or secondary education programmatic units. The requirements of each unit differ in some dimensions. However, both demand a minimum of sixty-four semester hours of which twenty-four are dissertation hours. Also included in the Ph.D. program are two college-level seminars, one departmental level research course, a research tool requirement, and at least one curriculum course. Cognate courses are encouraged and exist in departments outside the College of Education. Although numerous opportunities exist in all of the above courses for the environmental education specialist to expand knowledge and skills, the environmental specialty is drawn from the remainder of the program.

Ph.D. program hours are planned by the student with the help of an advisor and program committee to meet the requirements of the College of Education and the Graduate School, as well as the professional goals of the individual. Regardless of the student's goals, however, Ph.D. candidates are expected to demonstrate expertise in cognate areas of significance to them, pedagogical principles, and environmental education research.

Upon completion of formal course work, the candidate will complete the preliminary examination which is given by the programmatic unit and the student's committee. After the successful completion of the preliminary examination, the student is eligible to begin completion of the dissertation.

The Ph.D. dissertation is expected to show high attainment of independent and original scholarship. Similarly, it is anticipated that this research will somehow impinge positively upon the field of environmental education. Typically, said research will be descriptive or experimental although historical and philosophical research are sometimes appropriate.

During the entire Ph.D. program tenure, the candidate is, at all times, expected to fulfill environmental education leadership responsibilities. Such responsibilities can take a variety of forms; among these are conducting workshops, consulting with schools or other agencies, teaching methods courses, developing curricula, assisting in research projects, etc. Students are also expected to participate in professional organizations. This programmatic philosophy is based on the very real assumption that these activities will help produce a highly competent professional who can step into an environmental education position fully qualified for and committed to the field of environmental education.

The academic facilities of SIU-C complement the graduate program well. A large library contains nearly two million volumes and numerous services

for assisting scholarship and research. Computer facilities are modern and extensive. A Learning Resources Center gives assistance in both the soft and hardware needed by the curriculum developer. Assistance in instructional planning and technology is available. Consultants in research design and statistical analysis exist. The university has developed a strong support base for staff and students alike in order to promote scholarship and professional growth.

Et cetera

Requirements, constraints, and the bureaucratic logistics of degree programs, as described earlier, constitute only one facet in the development of a functional and thoroughly competent environmental educator. Many other variables also contribute to that end. Some of them are directly related to the degree-granting institution and some of them are far afield. It seems germane, therefore, to comment upon a number of indirectly related variables that could or should contribute to the development of a professional environmental educator at SIU-C.

Although difficult to operationalize, tradition at SIU-C promotes an almost familial relationship between students themselves and between students and graduate faculty. This somewhat unique condition probably exists because graduate students are respected and treated as contributing professionals. Similarly, staff members have deep and thoroughly sincere commitments to students. Not all students adapt well to this setting because they find that this condition, actually, places considerable responsibility on them to perform to the best of their ability--a situation not to the liking of all but the most committed students. Most students, however, commend the setting and state quite frankly that the responsibility promotes intellectual growth and thereby enhances professional maturity.

Numerous ongoing professional liaisons exist between former students and between former students and staff subsequent to leaving SIU-C. These liaisons, over the years, have contributed to the writing of books, development of curricular programs, conducting action and empirical research, the preparation of monographs, and numerous interuniversity relationships.

Over the past several years staff members in science and environmental education at SIU-C have annually received monies from either the U.S. Department of Energy or the National Science Foundation to conduct in-service education programs in either science or energy education. Those programs conducted for science in-service purposes have typically involved environmental education graduate students due to the ecological content involved in them as well as the inherent environmental issue overtones. In all instances, graduate students were somehow involved in the energy education projects. This project productivity is likely to continue at SIU-C, providing still further growth opportunities for environmental education graduate students.

Reseach thrusts at SIU-C are numerous and, in large part, a function of the graduate program. Students and/or staff have, over the past few

years, investigated such variables as the substantive structure of environmental education, the infusion of environmental education into existing content areas (the geosciences and biology), environmental education in early childhood education, students' citizenship action behaviors as a function of classroom treatments, citizenship action skills of pre-and-in-service elementary teachers, the use of community and regional resources by classroom teachers, problem identification in middle school environment education, and perceptions of the importance of environmental issues in a variety of adolescent and adult populations.

A number of examples of curriculum development projects have also been produced by students and staff at SIU-C. Included would be a modular program to develop investigation and action skills for environmental problem solving. Currently under development is a modular program to provide secondary school students with environmental citizenship action skills. Also developed by students have been kindergarten materials on pollution, infusion units for use in high school science, a number of case studies including ones on population and wilderness preservation, and a curriculum program for use in environmental programs at the SIU-C Touch of Nature Environmental Center.

Perhaps one of the most significant aspects of the SIU-C program lies in the environment adjacent to Carbondale itself. Existing between the Ohio and Mississippi Rivers, just south of the glaciated plain of central Illinois, lying in the center of enormous coal reserves, next to the Shawnee National Forest, and within what is called the Canada Goose Quota Zone (due to the high concentration of wintering Canada geese), the SIU-C region offers both dramatic scenery and a plethora of very real environmental issues which can be studied first hand. These issues include wildlife management, endangered species, wilderness preservation, high sulfur coal extraction, strip mine reclamation, soil erosion, pesticide/herbicide contamination, land use management, energy consumption and conservation, zoning, and timber management. Aside from issues within the region, the area abounds with scenic features and offers tremendous recreational opportunities. Although the climate is hot and humid throughout the summer months, the region is an ideal one for the student of the environment--particularly one interested in natural history and resource management.

In Summary

Southern Illinois University at Carbondale offers concentrations and/or specializations in environmental education at all degree levels. However, the greatest opportunities for depth and professional expertise exist at the graduate levels. Official program offerings and the collegial atmosphere of graduate students and staff provide a sound basis for professional training and development of expertise in formal and non-formal environmental education.

NOTE: 1. Graudate students at SIU-C interested in non-formal environmental education training or interpretive skills often matriculate in the Forestry Department and work under the direction of Dr. Paul Yambert.

A UNIVERSITY PRESIDENT'S VISION: LORADO TAFT FIELD CAMPUS THIRTY YEARS LATER

by Clifford E. Knapp*

From its inception thirty years ago, the Lorado Taft Field Campus of Northern Illinois University has been devoted to teacner education as it applies to learning resources outside the classroom. During both the junior and senior years, prospective elementary teachers participate in the "Taft experiences." The junior experience focuses on increasing awareness of the teaching/learning potential in the outdoors; during the senior year, the experience is directed toward the teaching of children in an outdoor setting. The Taft Campus also offers formal graduate programs, as well as in-service courses directed toward teacher needs and interests.

OUTDOOR EDUCATION IS THE USE OF THE OUT-OF-DOORS TO FACILITATE AND ENRICH LEARNING [1]

1. In an outdoor education program, teach out-of-doors those concepts, skills, and attitudes which can be best learned in that setting.
2. Outdoor learning is studying an object or event in context when feasible.
3. Outdoor education should be an experience-based program not a bookish one, although books are often useful in the process.
4. Outdoor education is a method of approaching most subject matter areas. Its objectives are the same as those of general education.
5. Teachers often have difficulty in teaching effectively in outdoor classrooms until they have had experience in outdoor education themselves.
6. Outdoor education can introduce teachers to better teaching methods and new learning resources.
7. The outdoor classroom can be a laboratory for human growth and development, intelectually as well as socially.

Dr. Knapp is currently the Director of Lorado Taft Field Campus and Chair of the Faculty of Outdoor Teacher Education, Northern Illinois University, DeKalb, IL 60115. He is an associate professor in the Department of Curriculum and Instruction within the College of Education. He is a former elementary, junior and high school teacher with prior University teaching experience at Southern Illinois University and at various Colleges and Universities in the East. He has special interests in writing for teachers about environmental values, science, and human relations.

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Brief History of the Taft Campus[2]

When Leslie A. Holmes was inaugurated as president of Northern Illinois University in 1949, he spoke of a vision:

> In certain areas, the best teaching and learning situations cannot always be achieved on campus. This is especially true for education, as well as in some of the phases of professional education. Many of the courses in these fields should be taught where both the students and the instructors can live the courses as they are being developed. For example, it is very difficult to achieve success in studies of flora and fauna without examining the area where they are found in their natural habitat. Another example is the problem of teaching earth sciences in the classrooms, while still another is the difficulty of painting outdoor scenes from memory. In other words, to fulfill our obligation to the state--to educate teachers for Illinois--it is necessary for the college to make available to certain of its students and to the faculty, facilities that will permit them to live with nature as they work with her. Only she can give the best physical surroundings to achieve certain educational goals, not the least of which is the goal of learning to live together in a cooperative and congenial family.[3]

To implement his educational vision, he recommended the acquisition of a field campus to be located in an appropriate setting away from the main campus. He spoke about ways in which this outdoor learning area could be used in teacher education:

> This field study campus could be used in many tangible ways as indicated, but one of the great intangible benefits would be that of teaching a living democracy and of affording experiences to prospective teachers as well as to in-service teachers that they need and cannot obtain by any other method. The youth of Illinois have a right to expect and to receive the best in education from their teachers.[4]

In 1951 Governor Adlai E. Stevenson signed the law which transferred a sixty-six acre parcel of park land to Northern Illinois University. The tract of forested land contained several dilapidated buildings of a former art colony, once headed by sculptor, Lorado Taft. Shortly after the acquisition, the University began a restoration program using local labor and NIU students enrolled in a building trades class. The renovation of four buildings was completed in 1954 and a director and education director were hi ed.

Even before the renovation of the buildings was completed, the University offered a natural history field course using the flora and fauna found on the property. Formal class sessions were held in an adjacent park building. The course was designed for elementary and secondary education teachers to increase their understanding of the natural environment. The first over-night use of the reconstructed buildings was in the fall of 1953 for an outdoor education workshop.

The first class of Elementary Education majors attended the Lorado

Taft Field Campus for five days in September, 1954. This was an outdoor learning experience for University seniors, and no public school children were involved. Later that fall, a senior class of Elementary Education majors and a class of sixth graders from the campus laboratory school spent five days in residence and participated in a pilot teacher education project. This cooperative venture between University and public school classes was later to become the foundation of a model program in outdoor teacher education. This innovative concept provided University seniors with opportunities to teach outdoor lessons to children in a residential setting. Since that time a "Taft experience" for seniors in conjunction with elementary or junior high school students has become an accepted component of the Elementary Education teacher preparation program. Expansion of people, programs, property, and facilities has taken place gradually since 1954.

Don Hammerman was employed as the education director in 1954. Dr. Hammerman was one of the leading forces behind the teacher education program in outdoor education. Two outdoor education courses were offered in the summer of 1954 and three in 1955. The Department of Outdoor Teacher Education (OTE) was established in 1959 and the summer session was supplemented with year-round courses offered during all academic semesters. Dr. Hammerman was appointed director of the Taft Campus and Chair of the Department of OTE in 1965. An additional land purchase in the same year expanded the Campus to 141 acres.

From an early beginning with elementary education seniors, the program was expanded to include sophomores and juniors in 1955. In the early years, seniors came to the Taft Campus with school children to teach for five days, returning later for an additional two and one half days of evaluation sessions following their student teaching. Majors from physical education, special education, secondary education, educational psychology, and various arts and sciences from the University have attended the Taft Campus over the years.

During the 1956-57 academic year, a teacher education program was instituted for every sophomore, junior, and senior elementary education major at Northern Illinois University. This format continued virtually unchanged except for an increase in enrollments, for the next ten years. In 1964-65 the 2½ day sophomore outdoor experience was formally eliminated, however selected sophomore Educational Psychology classes still continue to attend. These psychology professors are convinced of the value of students learning in a setting with children instead of from human development and behavior texts alone.

During the 1977-78 academic year, the College of Education was reorganized and the Department of OTE became a Faculty of OTE within the Department of Curriculum and Instruction, where it remains today.

From its inception thirty years ago, the Lorado Taft Field Campus has been devoted to teacher education as it applies to learning resources outside the classroom. Although the field of education has changed somewhat in that time, the teacher education function of the Taft Campus has not. The OTE faculty advocate the following objectives for teacher education students:

1. Demonstrating opportunities for using the out-of doors as an extension of the classroom to enrich learning.

2. Developing an awareness of the scope of the activities emcompassed by outdoor education.

3. Demonstrating ways of using the outdoor laboratory as a vehicle for teaching and learning.

4. Developing an understanding of how learning takes place.

5. Developing the ability to use milti-sensory approaches to teaching and learning.

6. Using more exploratory learning in teaching.

7. Understanding and using teacher-pupil planning.

8. Participating in meetings that involve good group process techniques.

9. Recognizing the values derived from an informal group-living experience.

Undergraduate OTE Today

The outdoor teacher education program has evolved and changed somewhat from the early plan of the fifties. Decreased enrollments in teacher preparation programs and new trends in American education have contributed to some of the changes. Today, juniors enrolled in Elementary Education and some Special Education and Physical Education majors attend the Taft Campus for 2½ days. Most of these students participate in a program designed to increase their awareness of the teaching/learning potential of the outdoors and the application of outdoor education to teaching content and processes in general. They engage in selected activities from various subject matter disciplines. Other important general objectives of the junior experience include:

1. To apply teaching methodology and other aspects of the teacher education program to an out-of-classroom setting.

2. To gain more understanding and appreciation for ecological relationships and the impact of people on the environment.

3. To increase knowledge in group dynamics and to learn to work more cooperatively.

4. To prepare students for their senior experience of teaching children at the Taft Campus through information and experience about curriculum and lesson planning.

The senior experience in outdoor education at the Taft Campus is primarily directed towards the teaching of children in an outdoor setting. The four-day session is a mini-student teaching opportunity for seniors to apply what they have learned about children and the teaching/learning process. More specific objectives of the senior experience include:

1. To use a variety of direct-learning resources outside the classroom setting

2. To integrate outdoor instruction with on-going classroom instruction.

3. To practice motivational techniques.

4. To practice questioning and inquiry techniques.

5. To apply methods for increasing student self concepts.

6. To work cooperatively with others in a team-teaching effort.

7. To participate in teacher-pupil planning.

8. To evaluate student learning resulting from outdoor lessons.

The effectiveness of the junior and senior experiences is currently undergoing study and re-evaluation. A report was commissioned to assemble all related documents and to interview twenty-one involved faculty to seek opinions about future program direction. Five areas were studied in depth: 1) program philosophy, 2) program objectives, 3) developmental sequence, 4) specific activities, and 5) program management. The results of this investigation will provide some of the data for revision and improvement of the undergraduate component of the program. Two selected excerpts from the Report indicate a general consensus of faculty support for the clinical experiences.

"Almost all faculty interviewed (Elementary Education and Outdoor Teacher Education) believe that the Taft experience is an unique and important part of the Teacher Education Program offered by Northern Illinois University."[5]

"On the whole, persons interviewed about the senior experience felt that it was a unique and invaluable experience for pre-service teachers."[6]

Evaluative instruments are also used in assessing program effectiveness, including self-report opinionnaire and standardized tests administered by faculty and graduate students. A process of soliciting participant feedback and engaging in evaluative dialogue has resulted in greater awareness of programmatic problems and gradual program improvement.

Undergraduate Courses in OTE

There is no formal undergraduate degree in outdoor teacher education. There are however, opportunities for elementary education majors to take courses in outdoor education. The eight undergraduate courses are:

CIOE 200 The Community: An Educational Resource (3)

CIOE 320 Teaching Toward Environmental Quality (3)

CIOE 321 Survey of the Principles of Natural and Physical Sciences (3)

CIOE 410 Foundations of Outdoor Education (3)

CIOE 417 Arts and Crafts in Outdoor Education (3)

CIOE 482 Clinical Experiences in Outdoor Teacher Education (1-3)

CIOE 483 Outdoor Education/Laboratory Experience (1)

CIOE 490 Workshop in Outdoor Education (1-3)

Graduate Courses in OTE

In addition to sixteen 500-level courses available to graduate students, the five 400-level courses previously listed carry both undergraduate and graduate credits. The sixteen graduate courses are:

CIOE 503 Introduction to Educational Research in Outdoor Education (3)

CIOE 504 Historical and Philosophical Development of Outdoor Education (3)

CIOE 511 Advanced Field Experiences in Outdoor Teacher Education (3)

CIOE 519 Leisure and the Outdoors (3)

CIOE 520 Environmental Quality Education (3)

CIOE 521 Outdoor Interpretation (3)

CIOE 525 Teaching Physical Science in the Outdoors (3)

CIOE 526 Field Science (3)

CIOE 530 The Role of Media in Curriculum Development for Outdoor Education (3)

CIOE 570 Organization and Administration of Outdoor Education Programs (3)

CIOE 575 Seminar in Outdoor Education (3)

CIOE 586 Internship in Outdoor Education (1-6)

CIOE 590 Workshop in Outdoor Education (1-3)

CIOE 592 Special Topics in Outdoor Education (1-6)

CIOE 597 Independent Study in Outdoor Education (1-3)

CIOE 599 Master's Thesis (1-6)

Graduate OTE Today

Two primary thrusts are made at the Graduate level in outdoor teacher education: 1) Formal graduate programs and 2) In-service courses directed toward teacher needs and interests.

The faculty of OTE, comprised of nine members, is part of the Curriculum and Instruction Department within the College of Education. The individual faculty members have had considerable experience in the field and many have contributed through writing, speaking and consulting in the United States and abroad.

Master's Degree

The Master of Science in Education degree has been offered in OTE since 1963. More than 500 students have graduated from the program to date.

Students electing a Masters in OTE may follow one of two available program options.

Option I consists of a minimum of 21 semester hours of outdoor teacher education courses including a core of foundations, research, and thesis, as well as 9 semester hours taken outside the outdoor teacher education offerings.

Option II consists of the same course pattern as in Option I, with the exception of the thesis which carries six semester hours of credit. Two additional three-hour courses are substituted for the thesis.

Either option allows the student a considerable range of choices, tailored to meet individual interests and professional aspirations. Within certain limitations, the student, along with an advisor, designs a Master's program that is most appropriate. Upon satisfactorily completing the courses and oral and written comprehensive examinations, the Master's degree in OTE is conferred. Graduates of the program select a variety of employment positions. Many teachers decide to return or continue in their roles as classroom teachers. The Master's program expands the teacher's expertise in using learning resources outside the classroom to teach various subjects. Other graduates seek administrative and supervisory positions in outdoor/environmental programs within schools or agencies. The Master's program provides a

philosophical base upon which leadership skills are built. Other graduates find employment in nature centers and in other outdoor recreational settings. The Master's program offers opportunities for experience in field science, leisure, and interpretation. Some graduates are employed by Colleges and Universities to teach courses and conduct programs in outdoor/environmental education and related fields.

The Master's program prepares some individuals for leadership positions in higher education.

Doctoral and Certificate of Advanced Study Programs

Students interested in graduate study beyond the Master's Degree are encouraged to apply for admission to one of the programs in the College of Education. While the Faculty of OTE does not offer advanced graduate degrees, its membership in the Department of Curriculum and Instruction permits the pursuit of a program with outdoor education as a cognate field. Students may select various other major fields for doctoral and certificate of advanced study degrees such as secondary education, adult education, and physical education.

The Department of Curriculum and Instruction offers three areas of specialization at the doctoral level: curriculum and supervision, elementary and early childhood, and reading. Outdoor education as a cognate field (15 semester hours or more) may apply to any of these areas. In the past a number of students have selected dissertation topics in outdoor/environmental education and related areas.

To summarize the on-going programs of the Lorado Taft Field Campus and the faculty of Outdoor Teacher Education, the following goals and objectives are offered:[7]

Goals

A. To provide undergraduate and graduate students with the knowledge, skills, and attitudes required for effectively using outdoor environments in teaching.

B. To provide inservice teachers and others with educational responsibilities with the knowledge, skills and attitudes needed for organizing and administering outdoor education and related programs.

Program Objectives

In order to reach the two main goals, these specific program objectives have been established:

1. To offer courses leading to effective use of the out-of-doors to facilitate and enrich learning and to a Master's Degree in Education with a major in Outdoor Teacher Education.

2. To provide graduate student internship opportunities in which they plan, conduct and evaluate resident outdoor education for elementary and secondary school students.

3. To provide students with a variety of field experiences, including residential and others on a field trip basis using Lorado Taft Field Campus, the school site, or other local areas.

4. To conduct research in outdoor/environmental education and related fields.

5. To develop and evaluate models for outdoor teaching, site development and outdoor programming.

6. To disseminate publications in outdoor education and related fields.

7. To provide consultation and speaker services, locally and on a national and an international basis.

8. To maintain an Instructional Materials Center containing a wide selection of outdoor education print and non-print materials, supplies and equipment.

The review and assessment of the OTE program is a formidable task. Over the past thirty years, various aspects of the program have been evaluated with varying levels of depth and degrees of expertise. Evaluation has truly been continuous. Although survival and the present-day magnitude and nature of personnel, program, finances, and facilities can be considered ample evidence of program success, the evaluative process is still on-going. Within the 1981-82 academic years the OTE program faces the scrutiny of various influential review boards. The Program must be approved by the Illinois Board of Regents and the National Council for Accreditation of Teacher Education.

The Future

Using a crystal ball in predicting the future of education has always been a dubious process. Trends and fads in education can not be readily projected with accuracy. The influence and power of education in this country and the world is obvious. The needs related to educating our society fluctuate along with the political, economic, and social climate.

The future of outdoor teacher education will undoubtedly depend upon the future of education in general. Already, waves of support have gathered momentum behind particular segments of our society. The emotionally and physically handicapped, bi-lingual, urban poor, monorities and the ageing populations have drawn financial and moral support. OTE must direct more effort to these societal needs.

The future can and should hold a continued quest for quality in present program endeavors. The need for improved teaching skills outside the classroom in a changing world is still desirable. Members of society will continue to demand quality leadership from our teachers, nature interpreters, and outdoor/environmental educators. It is to this end that the Lorado Taft Field Campus and Faculty of Outdoor Teacher Education is directed.

NOTES

[1]Adapted from "Some Concepts Basic to Outdoor Education," Faculty of Outdoor Teacher Education, Lorado Taft Field Campus. Northern Illinois University, mimeographed, n.d.

[2]Much of the historical information was taken from "Acquisition and Development of the Lorado Taft Field Campus" by Nancy C. Swanson. Master's Thesis. Northern Illinois University, 1968.

[3]William P. Froom. A Decade of Outdoor Teacher Education: Ten Pioneering Years at Northern Illinois University's Lorado Taft Field Campus, Oregon, Illinois 1951-1961. Office of Regional Services, Northern Illinois University, DeKalb, Illinois, page 7.

[4]Ibid.

[5]Elizabeth Hammerman. "An Examination of the Outdoor Education Component of the Elementary Education Program" unpublished study issued by the Department of Curriculum and Instruction, Northern Illinois University, November 4, 1980, page 9.

[6]Ibid., page 13.

[7]"Goals for the Faculty and Staff in Outdoor Teacher Education" Faculty of Outdoor Teacher Education, Lorado Taft Field Campus, Northern Illinois University, mimeographed, October, 1980.

Appendix: Lorado Taft Campus Materials and Services*

Periodicals

1. Taft Campus Newsletter

A mimeographed newsletter issued twice a year since 1954 to publicize the activities of the faculty and staff. (available free)

2. Teachers Outdoors

A mimeographed newsletter issued once a year written by teachers for teachers to disseminate information about environmental and outdoor teaching. (available free)

3. Journal of Outdoor Education

A collection of readings in outdoor/environmental education published twice a year since 1966. (available free)

*Send to the Taft Campus Bookstore for a complete list of available books and monographs and accompanying price list. Box 299, Oregon, IL 61061.

4. Taft Campus Occasional Papers

A series of over thirty-five monographs on various topics written by Outdoor Teacher Education faculty and staff ($0.50)

Mimeographed Materials

Outdoor Education Guidebook for Lorado Taft Field Campus. A policies and procedures manual for faculty and staff. ($3.00)

Readings in Adventure Education. Nineteen articles from various sources compiled between 1974 and 1976. ($3.00)

Peanut Butter and Jelly: A Campfire Primer. An activity book of techniques, songs, games, stories and skits for campfires. ($0.75)

Salt and Pepper: Table Games, Quiet Games and Campfire Games That Work. ($0.75)

The History of Organized Camping the United States, H.W. Gibson Reprints of a series of articles which originally appeared in The Camping Magazine in 1936. ($2.00)

Directory of Resident Outdoor Education Sites in Northern Illinois and Southern Wisconsin. Contains information on over forty centers related to availability, acres, capacity, staff, and learning resources. ($0.75)

School Camping by George W. Donaldson. Re-published by Lorado Taft Field Campus from the original text first appearing in 1952. A philosophical approach to school camping based on a concept pioneered by the late Lloyd B. Sharp ($2.00)

Services

1. In-service teacher workshops on various outdoor/environmental topics such as "Using School-Site snd Community Resources", "Outdoor Biology Instructional Strategies", "Environmental Values Education", "Resident Outdoor Programming and Administration", and Energy Curriculum."

2. Speaker and consultant services on a wide range of outdoor/ environmental education topics.

3. Resident outdoor facilities for school and conference groups. Accommodations for up to 140 persons.

4. Outreach courses to various parts of the United States and abroad in cooperation with the College of Continuing Education, International and Special Programs, and the National Wildlife Federation.

5. Special short courses on weekends dealing with topics such as winter activities, outdoor biology, and outdoor curriculum packages at the Taft Campus.

6. A wide range of undergraduate and graduate courses offered during the summer at Lorado Taft Field Campus.

7. A comprehensive collection of print and non-print resources housed in the Taft Campus Instructional Materials Center. Of special interest to outdoor/environmental educators are over 600 research studies and a complete ERIC (Educational Resources Information Center) microfiche collection in these and related fields. An employment placement service is also an important feature of the IMC.

8. Teaching Assistantships and Fellowships. Each academic year the faculty of Outdoor Teacher Education is allotted a number of departmental graduate teaching assistantships. For students who qualify and who wish to reside at Taft Campus and participate in the internship program, there is an opportunity to receive room and board in addition to the tuition waiver and stipend. Partial Fellowships for qualifying outdoor teacher education majors are also available.

TEACHER EDUCATION PROGRAM IN ENVIRONMENTAL EDUCATION: UNIVERSITY OF WEST FLORIDA

by Herman C. Kranzer*

Although the University of West Florida does not have a formal environmental education major, there are a number of environmental education and environmental content courses available for both pre-service and in-service teachers. Such courses include "Teaching Children about Energy and the Environment," "Teaching Environmental Conservation," "Man and Nature," "Politics and Policy of Natural Resources," "Environmental Psychology," and "Conservation of Environmental Resources."

The University of West Florida is an upper-level state university enrolling juniors, seniors, and graduate students in three colleges: 1) Arts and Sciences, 2) Business, and 3) Education. Annual enrollment is approximately 5000 full-time students at the main campus, ten miles north of downtown Pensacola, and at the two centers at Eglin-Ft. Walton Beach and the Panama City.

West Florida's main campus is situated on 1000 acres of rolling hills and natural woodland fronting on the Escambia River and Thompson Bayou, about 30 miles from the Gulf of Mexico. The physical plant is designed to complement the natural beauty of the site which is designated as a wildlife sanctuary and nature preserve. Jogging trails, picnic, canoeing, sailing, and other standard sports facilities are available for student and community recreation. Two nature trails, with self-guiding booklets, lead through a variety of biomes representative of Florida panhandle environments. Additionally, the University owns 175 acres of beach property on nearby Santa Rosa Island. Adjacent to the Gulf Islands National Seashore, the area is utilized both for research and for recreation.

The College of Education administers pre-service and in-service teacher education programs in early childhood, elementary and secondary education, special education, educational leadership, and vocational education. Secondary education programs are managed on a cooperative basis with the various disciplines in the College of Arts and Sciences. Actually, there is no environmental education major available in the various teacher education programs of the University of West Florida, nor does the state of Florida certify in this field. However, there are a number of environmental education and content courses students may elect, or be required to take, in the regular certification and degree programs. Generally, students take two education electives and two non-education electives in their program of studies. A description of these offerings follows.

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A course entitled "Teaching Children About Energy and the Environment"-SCE 4938/6938-is an elective for in-service and pre-service elementary and secondary teachers. The purposes of the course are to (1) make teachers aware of, and knowledgeable about, ecological principles and environmental problems, (2) make teachers aware of, and knowledgeable about natural resource-use and associated energy problems, and (3) provide teachers with materials, methods, and techniques for an interdisciplinary approach to teaching about energy and the environment. Utilizing a theme of "awareness--knowledge--action," participants are introduced to content, materials, and methods in environmental and energy education. Energy sources and problems are studied in the context of natural ecosystems, natural resources, and cultural settings. Major topics include ecology of natural systems, environmental economics--policy--law, our geological environment, energy and pollution. The education component follows an interdisciplinary curriculum model of developing activities for concept understandings, skills acquisition, values clarification, and environmental encounters. Teachers become acquainted with effective classroom and field activities for any level, K-12. The course includes lectures from environmental specialists, field trips, films, discussions, distribution and use of free curriculum materials, and student presentations of practical classroom projects, activities, and teaching aids. This course, offered for the first time in Summer 1980, attracted 28 students, three-fourths of whom were in-service teachers.

Another course entitled, "Teaching Environmental Conservation"-SSE 5313, has been offered regularly in summer session since 1970, enrolling 12-20 students per class. While much the same in format and general purpose as the aforementioned course, energy education is not stressed to the same extent. The purpose of this course is to develop school and community leadership in conservation and resource-use education. Students are introduced to natural resource management practices and problems with forests, soil, water, minerals, wildlife, air, land, and people. Methods for teaching conservation are explored, discussed, and demonstrated. Instructional procedures that are utilized include lectures, discussions, field studies, and student presentations of school and/or community project ideas. This course is required for all middle school/junior high school teacher education undergraduates, whether in the math-science or language arts/social studies track. It is an elective for all other pre-service and in-service people. Among pertinent comments written by students on course/instructor evaluation forms are such items as: "Classes were very well organized. The field trips were educational and informative." "Outstanding program of actual experience for teachers. The course objectives and activities were well coordinated." "We were able to apply what we had read in the text by seeing the things we had read about."

All elementary, early childhood, and special education majors are required to take an elementary science methods course-SCE 4310-and a social studies methods course-SSE 4113. Middle school/junior high school majors take one or the other, depending upon their track. Both of these courses include a unit of environmental education, involving off-campus clinical experience with children.

Possible electives for any pre-service or in-service education student are offered in the departments of biology, political science, psychology, and

earth and atmospheric sciences in the College of Arts and Sciences. The biology department offers a course entitled "Man in Nature"-BSC 3030, which deals with problems that man faces as he attempts to cope with and understand his environment, himself, and his position in nature.

"Politics and Policy of Natural Resources"-PAD 4340-in the political science department is designed to familiarize students with the policy and politics of resource use and distribution. Individual resources systems are examined and related to systems of technology assessment, development, transfer, and control.

The psychology department offers "Environmental Psychology"-PSY 5933-which explores the complexity of man's/woman's relationship to the environment. It includes such topics as environmental perception, role of specific environments (work, school, social, etc.) in determining behavior, proxemic behaviors, and the quality of the environment.

"Conservation of Environmental Resources"-GEO 3370-utilizes a problem-solving approach in dealing with current biotic and human resources. It focuses on resource management, as part of an environmental studies track in the social sciences interdisciplinary program. The earth and atmospheric sciences department offers this course and others as part of a program to train people in urban and regional planning or environmental monitoring and planning.

Other environmentally related content courses in such fields as ecology and earth science and also available as electives. However, they are too numerous to mention here.

In summation, the University of West Florida is blessed with an ideal situation for teaching environmental education. Coastal, estuarine, forested, riverine, and grassland environments are all within a 25 mile radius of the campus, itself largely kept as a natural area. The region's approximately 250,000 inhabitants live in a mix of urban, suburban, and rural communities, engaged in manufacturing, agriculture, forest industry, electic power generation and other enterprises. Resource management, land-use problems, pollution, energy, and most other topics associated with environmental education abound and are easily studies first hand. Given the combination of available electives, the program time to schedule such courses, the setting and resources of the University, it is disappointing to report that very few students choose to focus on environmental education as an additional area of interest. The need to strengthen and promote environmental education as part of the pre-service and inserive teacher education programs seems obvious. As a fitting conclusion to this report on the status of environmental education at West Florida, it is quite appropriate to note that the chambered nautilus is emblazed upon the University seal, with its colors of blue and green symbolizing the sky and the sea, the vast knowledge that humankind has explored and the future yet to be conquered.

MASTER'S DEGREE IN GENERAL STUDIES-OUTDOOR EDUCATION: SOUTHERN OREGON STATE COLLEGE

by Ron Lamb*

The basic philosophy of the Master's program in outdoor education at Southern Oregon State College is that the majority of the professional core coursework is taught in the outdoor environment, utilizing field experiences whenever possible. The interdisciplinary curriculum consists of eighteen hours of core courses, plus at least nine hours of coursework selected from science offerings and nine hours from social science offerings.

The M.S. degree program at Southern Oregon State College is a practical program of an experiential nature in Outdoor/Environmental Education.

It was designed in 1968 to meet an expressed need for formal training in Conservation, Environmental and Outdoor Education for public and private school teachers, resource agency personnel, interpreters and other youth leaders who wanted to be able to utilize the outdoors as an effective means of complementing and supplementing their existing educational programs.

At the time of its inception, it was felt that an interdisciplinary program of science, social science and professional outdoor education courses would best meet the needs of the diverse groups of people in the various fields. This feeling has since been reinforced and is one of the facets of SOSC's program that remains fairly unique.

Our primary goal is to provide a background of subject matter about the environment that is appropriate for various educational levels, and to provide professional methods and techniques to be able to utilize that background in an appropriate environment.

We are proud of the fact that we practice what we preach! The professional core of Outdoor Education classes is largely taught outdoors, utilizing the same experiential, hands-on, discovery approach that forms the basis for the programs that we teach about. Students have the opportunity to gain a great deal of practical experience working with youth groups in outdoor settings under real life situations through a variety of practicum experiences.

The introductory course, ED 496G, Outdoor Education and the School Curriculum, gives an overview of the extent and diversity of the field and introduces the students to the philosophy, methods and techniques of Outdoor Education.

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ED 497G, Practicum in Outdoor Education, provides students with an opportunity to get practical experience with a variety of age groups. Students develop lesson plans and implement them in the field.

ED 584, Administration in Outdoor Education Programs, emphasizes the practical problems of setting up, implementing and evaluating Resident Outdoor School programs, and is capped by the actual operation of a camp for 10, 11, and 12 year olds.

SC 421, 422, 423, Field Studies in Natural History, provides a concentrated living-learning program utilizing the natural areas in Oregon. This two-week field trip visits Eagle Cap Wilderness, the Three Sisters Wilderness, and Malheur National Wildlife Refuge in successive summers.

In addition to the professional core described above, the student selects 21 hours from a variety of environmentally-oriented science and social science courses to fill the requirements of this aspect of the program. Each candidate has nine hours of electives to flush out the program.

Competencies Upon Graduation

Competencies to be expected of graduates of this program:

1. Understanding of the interrelationship of man and his natural and man-made environments.

2. Understanding of the basic principles and information about natural resources and resource management problems.

3. Ability to identify these aspects of existing curriculum that can best be taught out-of-doors.

4. Ability to plan and implement meaningful outdoor experiences in their own schools, such as:

   a. utilization of school grounds.
   b. utilization of natural areas away from school grounds.
   c. residencial outdoor schools, and
   d. field trips, nature trails and other outdoor laboratories.

5. Ability to use the methods, tools, skills, and techniques of the naturalist, the scientist and the outdoorsman in enriching and extending the existing curriculum.

6. Ability to integrate and coordinate outdoor experiences into on-going school programs.

In the past 11 years we have graduated over 120 candidates. About one half of these have entered or have remained in the field of teaching. Many of the teachers have the added responsibility of coordinating the environmental education program for their school or school districts.

The remaining 50% have entered a variety of fields including interpretation and information and education for private industry and state and federal resource agencies such as the U.S. Fish and Wildlife, the Forest Service, the National Park Service, and the Bureau of Land Management.

The past two years have seen an increase in the utilization of practicum experiences and the development of an Environmental Intern program to provide a full time work experience in the field.

Early graduates of the program came exclusively from the field of education, seeking to increase their skills and background in the use of the outdoors. The curriculum developed to meet those needs is still intact.

Future development will emphasize the expansion of the curricular offerings to meet the needs of those candidates planning careers in Outdoor/Environmental Education in non-school settings both private and public.

TEACHER EDUCATION PROGRAM IN ENVIRONMENTAL EDUCATION: THE NEW JERSEY MARINE SCIENCES CONSORTIUM

by James A. Lanier*

Today some ten years after its inception, the New Jersey Marine Sciences Consortium has a membership of 23 colleges and universities. The NJMSC has projected a multi-faceted program which includes research and development, educational programs, advisory services, and a plan to establish and maintain facilities for use by member institutions. Two courses for teachers are offered to enable teachers at all levels to add a marine component to their programs.

Purposes of the Program

Teacher training efforts by the Consortium are designed to assist in the pre-service and in-service training of teachers, in coordination with the programs of our member institutions and the New Jersey Departments of Education and Higher Education. Our objective is to provide whatever training is necessary to enable teachers at all levels to add a marine component to their programs. The emphasis is on science but we are also involved with other disciplines, such as social studies.

Our course, conferences and workshops are designed to supplement those of our member institutions. We offer no major and credit is available only through our member institutions.

Courses Included in the Programs

At present, the only course specifically designed for teachers in our regular listings is MARINE SCIENCE EDUCATION. This summer we will offer a special course on the New York Bight funded by the Office of Marine Pollution Assessment. Outlines of both courses are attached. Virtually all our other marine science courses can be used by teachers as subject matter training to improve their background knowledge and skills.

Methods Used

The specific methods used in our two teacher courses are described in the outlines for those courses. We also use workshops, conferences and individual consultations as methods for assisting teachers.

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Measures of Success

Our primary means of evaluation is our attendance records. In certain instances, such as the "Coastal Problems and Resource Management" teacher training workshop, we have a specific objective such as having the course taught in as many high schools as possible. This provides an obvious standard of measurement.

Future Plans

We plan to continue offering our mix of credit and non-credit courses, workshops, conferences and teacher assistance programs (such as the Marine Education Materials System, or "MEMS"). We will increase our emphasis on programs for minorities and the disadvantaged and expand our offerings to pre-college students and teachers. 1981 is our "Year of the Child."

Member Institutions

Twenty universities and colleges in all sections of New Jersey, one in New York, and two in Pennsylvania are members of the New Jersey Marine Sciences Consortium.

1. Atlantic Community College
   Mays Landing, NJ
2. Brookdale Community College
   Lincroft, NJ
3. Cumberland County College
   Vineland, NJ
4. Fairleigh Dickinson
   University, Rutherford, NJ
5. Glassboro State College
   Glassboro, NJ
6. Jersey City State College
   Jersey City, NJ
7. Kean College of New Jersey
   Union, NJ
8. Lamont-Doherty Geological
   Observatory of Columbia
   University, Palisades, NJ
9. Lehigh University
   Bethlehem, PA
10. Monmouth College
    W. Long Branch, NJ
11. Montclair State College
    Upper Montclair, NJ
12. New Jersey Institute of Technology
    Newark, NJ
13. Princeton University
    Princeton, NJ
14. Ramapo College
    Mahwah, NJ
15. Rider College
    Lawrenceville, NJ
16. Rutgers University
    New Brunswick, NJ
17. Seton Hall University
    South Orange, NJ
18. Steven Institute of Technology
    Hoboken, NJ
19. Stockton State College
    Pomona, NJ
20. Temple University
    Philadelphia, PA

21. Trenton State College
Trenton, NJ

22. Union College
Cranford, NJ

23. William Paterson College
Wayne, NJ

NEW JERSEY MARINE SCIENCES CONSORTIUM

COURSE OUTLINE

500 Level THE NEW YORK BIGHT: The MESA 2 credits

Monographs as an Education Resource

I Brief Outline of the Course

As series of lectures and a field trip will introduce teachers to the MESA monographs, and through them to the ecology, resources and problems of the New York Bight.

II General Aim of the Course

To introduce pre-college teachers to the MESA (Marine Ecosystems Analysis) New York Bight Atlas Monographs, and their value as educational materials.

III Specific Objectives of the Course

A. To enable teachers to use the MESA monographs as texts in a wide variety of courses from social studies to the natural sciences, or to use them effectively as resource materials.

B. To inform teachers about the New York Bight and increase their awareness of the interaction of this marine area with the lives of the people living in surrounding land areas.

C. To increase teachers' skills in leading field trips and in using marine related materials in their teaching.

IV Content and Scope of the Course

A. Introduction to the Monographs: where to go to obtain the infromation you need, the titles in the series.

B. Water movement in the Bight: circulation, tides, storm surge, climate.

C. Geology of the Bight: sediments, beaches, erosion.

D. Biology of the Bight: plankton, benthos, fishes.

E. Uses of the Bight: maritime operations, mining, demographic patterns, waste disposal.

F. Cruising the Bight: a one day field trip on a research vessel to sites representative of both the values and problems of the Bight.

V Procedures, Techniques and Methods

Lectures and demonstrations, field work.

VI Instructional Materials

MESA New York Bight Atlas Monographs; audio-visual equipment and materials.

VII Basic Requirements for Completion of the Course

Assigned readings; examinations and quizzes; class and field trip participation.

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THREE DAY TEACHER TRAINING WORKSHOP
ON
COASTAL PROBLEMS AND RESOURCE MANAGEMENT

COURSE OUTLINE

A One Semester High School Social Studies Course

I Brief Outline of the Course

Course participants will review, evaluate and engage in several teaching activities from the one-semester high school environmental education course, COASTAL PROBLEMS AND RESOURCE MANAGEMENT (CPRM). This course is designed for anyone interested in environmental education in general, and land use and coastal problems in particular.

II General Aim of the Course

To prepare teachers to use CPRM in their classrooms and to provide background information on important coastal problems in New Jersey.

III Specific Objectives

After participating in this course, teachers will

1) gain increased understanding of the worth of coastal areas and the many problems and issues surrounding coastal resource use;

2) be able to use CPRM materials effectively; and,

3) be able to identify several specific coastal problems in New Jersey and be able to integrate them into the CPRM curriculum package.

IV Content and Scope of the Course

A. Description of New Jersey coast

B. Review of coastal problems in New Jersey

C. Description of U.S. coastal zone

D. Review of coastal problems throughout the nation

E. Economic, environmental and political implications of coastal development

F. Case studies of coastal problems

V Procedures, Techniques and Methods

Course participants will be involved in a variety of activities, including role-playing, simulation games and reviews of case studies.

VI Instructional Materials

The CPRM Teacher's Guide, containing 37 activities for high school students; coastal development simulation game; agency reports and news clippings of New Jersey coastal problems.

VII Basic Requirements for Completion of Course

Participation in course activities; review of all instructional materials and other readings.

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ENVIRONMENTAL EDUCATION: HUXLEY COLLEGE, WESTERN WASHINGTON UNIVERSITY

by John C. Miles*

Since the opening of Huxley College of Environmental Studies ten years ago, environmental education has evolved as a basic and integral part of the environmental studies field and is now one of the four major emphases of the college. Pre-service teachers concentrating in environmental education may choose from three options: 1) Teacher Education, 2) Outdoor Education and Interpretation, and 3) Mass Communication and Environmental Education. In-service teachers have had the opportunity to participate in a variety of environmentally oriented courses, workshops, and institutes.

Background

Huxley College of Environmental Studies is a unit of Western Washington University in Bellingham, Washington. Its first students arrived in the fall of 1970. Initially there was no environmental education program, except insofar as the whole college curriculum is itself such a program. The entire curriculum focuses on environmental studies, its broad goals being to prepare students to recongize and understand environmental problems, to engage in inquiry and research that can provide insight into these problems, and to explore alternative solutions to the problems. The College is an upper-division unit of the University, serving primarily students of junior and senior standing. There is also a small graduate program.

Currently the curriculum, which has undergone a steady metamorphosis over the past decade, focuses in four major areas: 1) Environmental Science, 2) Environmental Health, 3) Social Assessment and Policy, and 4) Environmental Education. After completing a set of common requirements in environmental studies, students select one of these "concentrations" as the major emphasis in their studies. The concentrations consist of a core of required courses and a menu of electives.

Huxley College's common requirements are intended to provide all environmental studies students, no matter their special interest, with a basic shared background in the interdisciplinary field of environmental studies. Prerequisites for the common courses exceed the General University Requirement in the sciences, and include two courses in biology, a general chemistry course, physical geology, and college algebra. The courses that comprise this core background are:

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Ecosystems Analysis - the application of the concepts and methods of ecological theory to environmental problems.

Human Ecology - an overview and survey of humankind's views of itself as a creature interacting with the natural environment and of various forms in which this interaction occurs.

Introduction to Environmental Pollution - a review of the problems of air and water pollution, pesticides, radiation, hazardous substances and noise. This course provides information on the current status of the technology of environmental quality and stresses the interaction of pollutants with human health and the environment.

Environmental Economics - Topics covered include: economic analysis of environmental quality; environmental quality as a public good; theory of economic efficiency and the concept of an "optimal" amount of pollution; welfare criteria for resource allocation; implications of the no-growth economy.

Environmental Ethics - an examination of philosophical dimensions of human-environment relations, with emphasis upon ethical problems and dilemmas. Several contrasting views of humankind are considered, and the influence of these views upon environmental behavior are examined. An attempt is made to describe an environmental ethic.

Another element of the common requirement is seminars, of which students must take a required number of credits. Seminar topics vary widely, with several being offered each year in environmental education.

Pre-Service Teacher Education

All students choosing to concentrate in environmental education satisfy these common requirements. The environmental education concentration offers three options: 1) Teacher Education, 2) Outdoor Education and Interpretation, and 3) Mass Communication and Environmental Education. Students choosing the Teacher Education option must satisfy certification requirements as established by the State of Washington. To do this they must satisfy the requirements for either an elementary education minor or certification in an "approved" secondary subject area like English, biology, or history. They must also satisfy a set of professional education requirements. Thus, an environmental education/teacher education program of study appears as follows:

[A] Huxley common requirements. Environmental Education requirements and electives	44 cr.
[B] Elementary Education Minor	26 cr.
[C] Professional studies sequence, including supervised teaching	30 cr.

[A] Huxley common requirements. Environmental Education requirements and electives	44 cr.
[B] Secondary subject concentration	45 cr.
[C] Professional studies sequence, including supervised teaching	30 cr.

Parts B and C of these programs are administered by other departments at the University. Part A is administered by Huxley College.

In addition to the common requirements in environmental studies, students choosing the teacher education option are required to take two environmental education courses. These courses are:

Introduction to Environmental Education - an overview and survey of the field. Topics covered include goals, EE through media, interpretation, outdoor education, humanistic and experiental approaches to EE, the study of values, qualities of the EE curriculum, and evaluation.

The Environmental Education Curriculum - surveys environmental education curricula. How have educators defined and addressed the goals of EE? The qualities of the ideal EE curriculum are identified. Specific curricular design strategies are reviewed and applied.

These required courses are supplemented by a minimum of two environmental studies electives. Students may select from the full range of environmental studies courses, and do so according to their interest. Several courses which focus specifically on environmental education are often elected. These are:

Outdoor Education - classroom and field study of outdoor education. Traditional outdoor learning methods and settings are reviewed, such as resident and school camping, fieldtrips, and school-site development. New approaches and programs such as Outward Bound and its adaptations are examined. Field experience in various outdoor settings is required.

Experiential Learning in Environmental Education - the special potential of experiential learning for environmental education is explored. Experiential learning theory and its application in specific settings are reviewed. A range of experiential learning practices such as simulation gaming, role-playing, awareness exercises, field study and outdoor pursuits are examined. The problem of evaluation of this type of learning is given special attention. Fieldwork is required.

Environmental Interpretation - study of the art of interpretation as it is practiced in parks, museums, historic sites and other settings. Emphasis is upon practical interpretive problems. Interpretive planning and program design are examined, and programs are implemented and evaluated.

The Writings of American Naturalists and Outdoorsmen - a review of the literary tradition of nature writing in America. The works of the Bartrams, Thoreau, Burroughs, Muir, Leopold, Carson, Krutch, Eiseley, Berry and others are read and discussed.

Other environmental studies courses commonly elected by students in the teacher education option include:

1. Current Environmental Issues
2. Oceanography
3. Alternative Futures
4. Systems Thinking
5. Technology: Change and Assessment
6. Environment and Politics
7. Wildlife, Forest and Park Management

It must be admitted that because of the extensive requirements of parts B and C of teacher education programs few students take more than the minimum of elective courses. This is especially true of students who begin their programs as juniors. Students who decide to combine teacher education and environmental education early in their college years can take more environmental studies electives. Also, more environmental education students pursue certification at the elementary level because there is more flexibility at this level than in preparation to teach in secondary school. Also, many are convinced that the elementary curriculum is better suited for environmental education, since its organization is more interdisciplinary than at the secondary level. Students preparing for elementary teaching can take more environmental studies electives.

Method

As has so often been noted, the medium can be the message, and at Huxley College the methods of study of environmental education are intended to demonstrate methods which students can use when they later become environmental educators. There are two emphases in the environmental education curriculum: one is on person-centered or humanistic educational process and the other is on experiential learning. A person-centered approach involves continuous assessment of learner needs and purposes and cooperation between learner and faculty in designing learning activities. It involves Rogerian

approaches to teaching or "facilitation" in all environmental education courses. Class groups engage in many activities designed to create an atmosphere of trust and nondefensiveness in which learners feel free to participate fully in classroom activities. Willis Harman has noted that what are needed in education are "Processes. . . that foster openness, authenticity, free exploration, and willingness to risk and that are supportive of the individual while he reexamines deeply-held values, perceptions and premises."[1] Such processes are used with Huxley College students, who by experiencing them can, through analysis of their experience and through reading and discussion, learn to use such processes in their educating.

The second emphasis is on experiential learning. Proceeding on the learning theory that students learn best that which they perceive as personally relevant, Huxley environmental education students are given many opportunities to take their classroom learning into the field. They go into public school classrooms and work with students of various ages. They conduct day-long and even overnight fieldtrips with school groups. They design and implement interpretation programs at a local nature center. They create an outdoor school each spring, designing the curriculum, preparing students in the classroom for the week-long experience, implementing the experience, then following up on it back in the classroom. They have, for the past four years, prepared bids for Youth Conservation Corps camps, then organized the camps and run them, with minimal faculty supervision. All of these experiences are assisted by faculty and provide opportunities for students to test the theory and method learned in the classroom in real-life settings. Having done so, most return to their classroom with a clear idea of their strengths and weaknesses, of knowledge gaps they need to fill, skills they need to acquire. They become intrinsically motivated to do the often tedious work of acquiring extensive reservoirs of resources and methods.

Space does not here allow adequate explanation and description of the two methodological emphases mentioned. Huxley College environmental education students acquire much content in their environmental studies courses, and in the environmental education courses examine the processes through which they have learned or failed to learn the basics of environmental knowledge. There is no dichotomy of process and content, but rather a balanced emphasis and recognition that content is always learned through some process, and in certain stituations some processes are more suitable for effective learning than others.

Future Plans

Several goals have been identified for improvement of the pre-service teacher education program. More faculty allocation to the program will allow for more courses to be taught. There is need for a course focusing specifically on the elementary school and potentials for environmental education there, and for other courses on integrating environmental education into secondary subject areas. There is need for courses directed at education majors at the University not specializing in environmental education. Most prospective teachers graduated from the University have no exposure to environmental education, and that needs to

be changed. Also, demand is high for master's-level work in environmental education, and graduate offerings in environmental education in the Pacific Northwest are very limited. A graduate program will be developed if and when the resources for it become available.

In concluding this section it is important to note that teachers graduating from Huxley College programs are not certified to teach environmental education. The State of Washington does not grant such certification. Rather, students are certified as elementary educators or in a secondary subject area (of which there are currently twenty-nine in this state), and are prepared to integrate environmental education into their elementary or secondary fields. In some respects this is as it should be, for environmental education is not and should not be a separate subject or discipline. Even so, there is need for broader recognition among teacher educators of the importance of environmental education so that more space can be allowed in programs of prospective teachers for coursework in this area.

In-Service Teacher Education

Huxley College has attempted throughout its ten-year history to assist in the large task of providing environmental education coursework for practicing teachers. The original stimulus for a pre-service EE program at the College came from local school districts who were interested in developing environmental education. The history of in-service offerings has been irregular, dependant primarily upon faculty resources. Two substantial federal grants allowed for extensive in-service offerings during the first half of the decade. Faculty reductions in recent years have allowed fewer offerings by Huxley College faculty but a large increase in offerings by adjunct faculty.

Huxley College's in-service efforts began with the Sedro Woolley Environmental Education Project in 1970. A basic course introducing environmental education to teachers was developed in this federally-funded project and offered as a ten-week continuing education course in many Western Washington school districts. "Education and the Environment" was the foundation and was followed by a number of ten-week courses that built upon it. These courses included: 1) "The Environmental Education Curriculum," 2) "Social Science Education and Environmental Problems," 3) "The Environmental Movement," 4) "Pollution in the Northwest: Current Status of Problems and Solutions." 5) "Alternative Futures and Educational Policy," 6) "The Indians and the Environment of the Skagit Valley," and 7) "Environmental Issues: Rationale and Application for Teachers." All of these were offered in the evening in a traditional classroom format and were intended to provide teachers with ideas and resources that they could use in integrating environmental education into their teaching.

A very successful in-service program was a series of weekend workshops that were offered, with some variation in content, each year for four years. These were offered for credit through the Division of Continuing Studies. They could be taken as a package of six or separately, and satisfactory completion of the workshop required development of a

learning package in which the teachers incorporated what was learned into their teaching. Workshops were conducted whenever possible in the field. They involved either ten or twenty contact hours with the instructor, usually over one or two days. One workshop series was as follows:

January 13 - The River: The Skagit as a System Worth Knowing About

A day exploring the river from the alluvial plain to the upper canyons, stopping at about ten sites to involve ourselves in the natural and human history of the Skagit; in land management and resources along the river; in the multiplicity of uses and the choices to be made. Resource people will come from the State Department of Natural Resources, the State Game Department, and Department of Ecology. Activities and materials for classroom use will be reviewed, and we will view one of the largest groups of wintering bald eagles in North America.

February 10 - The Island and the Estuary

An introduction to the island and estuarine environments of Whidbey Island and exploration of their teaching potential.

March 10 - Physical and Social History as Environmental Education

The LaConner Museum will provide the setting. The potential of history as EE will be examined.

March 31 - Esthetics and the Environment

The potential of art, music and literature as EE will be explored.

April 28 - Cruisin' in the City

The city as a learning environment is the focus here. This will be an intensive twenty-four hour marathon plunge into the City of Seattle.

May 4-6 - Eastern Washington Explosion

Life explodes on the high desert above the Columbia River in May. This workshop will observe this and pursue basic understanding of ecological concepts in this context.

Other workshops in this series included examination of appropriate technology, the Seattle-Tacoma International Airport as an example of a modern technological system, the Foxfire approach to cultural journalism as a medium for environmental education, and teaching about the environment through music. These workshops were coordinated and partially taught by Huxley College faculty, but there was extensive use of resource people from the community at large. The use of such people not only provided valuable content, but also revealed to participating teachers the wealth of human resources available to assist with their environmental education efforts. Testimony to the value and success of this approach came in the form of demand--there were invariably more prospective workshop participants than could be served.

During the past several years Huxley's in-service offerings have increasingly involved adjunct faculty, usually teachers with unique training or experience. This approach has increased because of time limitations of Huxley College faculty, but primarily in order to take advantage of the extensive reservoir of environmental education knowledge available in the ranks of educators in the region. Recently, for instance, developers of an excellent energy curriculum titled Energy, Food and You[2] conducted a course through Huxley for trainers who could in turn conduct workshops and courses to disseminate the Energy, Food and You materials and approach throughout Washington State. Some of the other courses and workshops offered specifically to teachers by adjunct faculty have been the following:

Confronting Energy Issues
Small Streams and Salmonids
Project Learning Tree
Mt. Rainier as an Environmental Education Resource
Camp Orkila Environmental Study Workshop for Teachers
Forest Conservation Workshop
Salmon Enhancement
Creative Botany
Short Course on the Columbia
The Learner in the Environment
Stream Restoration
Interpreting Skagit County's Forest Environment
The Stehekin Valley: A Historical Perspective
Northwest Encounter: Energy, Ecology, Land Use Field Studies and Instructional Strategies
School Ground Ecology
Washington and the Sea
Organic Gardening as a Method of Teaching Science
Outdoor Leadership Development
Solar and Geothermal Resource Systems

These offerings range widely in length and format. The Washington State Office of Environmental Education identifies teacher interest and encourages and generates course and workshop ideas like these listed above. Course proposals are submitted to Huxley College and are reviewed along with the credentials of proposed instructors. Such cooperation with environmental educators outside the University and utilization of their ideas and talents has enabled Huxley College to

assist in providing a wide range of environmental education offerings to teachers in this region.

The final in-service approach that has been used on three occasions is the summer institute. A menu of courses are offered specifically for educators. Several different formats have been used. An Energy Education Institute will be offered, for instance, during the summer of 1981. It will consist of two three-week sessions followed by workshops of varying length. Courses will focus on technical and social aspects of energy issues. A key course will examine energy education methods and resources that are available, and require that teachers transfer the information which they have learned in institute coursework into their curricula. Past institutes have sought to assist teachers in defining environmental education and in understanding the holistic and interdisciplinary qualities that must characterize an environmental education curriculum.

Future Plans

The College intends to continue its involvement with in-service teacher education along the lines it has followed so far. It intends to increasingly tailor its summer offerings for teachers through an annual summer institute on a topic of current interest and importance. There has been discussion of participation in an off-campus learning center which has potential for increased offerings to teachers. The very productive relationship with the Washington State Office of Environmental Education will be continued and expanded. There will be an ongoing effort to assess the needs of teachers and to offer programs to suit those needs. Finally, a graduate program for teachers has been envisioned, but no specific plans to begin such a program have yet been formulated.

Conclusion

When Huxley College opened ten years ago the field of environmental education was not in its curricular plans. Since then environmental education has evolved as a basic and integral part of the environmental studies field. A recent curriculum restructuring left environmental education as one of the four major emphases of the College. There is currently a strong commitment within the College to expansion of environmental education faculty and programs. As the need for environmental education in the educational system as a whole increases, Huxley College is devoted to assisting in the difficult task of describing this need and providing educators with the knowledge and skills needed to meet it.

NOTES

1. Willis W. Harman, "Alternative Futures and Educational Policy." Memorandum Report prepared for the Bureau of Research, U.S. Office of Education, February, 1970 (Menlo Park, California: Stanford Research Institute), p. 12.

2. Energy, Food and You was developed by teachers under the direction of Christina Peterson and Tony Angell. The curriculum materials are available from Washington State Office of Environmental Education, Shoreline School District Office, N.E. 158th and 20th Ave. N.E., Seattle, WA 98155.

3. Principal contributors to this program have been Dave Kennedy, Tony Angell, and Claire Dyckman of the Washington State Office of Environmental Education.

A COOPERATIVE TEACHER TRAINING PROGRAM IN ENVIRONMENTAL SCIENCE: OKLAHOMA STATE UNIVERSITY

by Ted Mills*

The teacher training program described herein involves the cooperative efforts of Oklahoma State University, East Central Oklahoma State University, Northeastern Oklahoma State University, the State of Oklahoma Conservation Commission, and the 38 Conservation Districts in Oklahoma. The objectives, over a three-year period are: 1) to upgrade the environmental science content background of 315 K-12 teachers and administrators organized in school system teams throughout Oklahoma; 2) to establish dialogue and cooperation between K-12 educators and members of the scientific community; and 3) to expose educators to career models where females as well as males plan important roles in environmental science research and teaching. The proposed project (Phase II) complements and extends a non-NSF summer training project (Phase I) conducted each summer which is directed at developing teacher awareness of environmental education curriculum methods and materials.

Purpose and Objectives

The Natural Resources and Environmental Education Center serves the growing demand for community and school environmental awareness. The Center makes available curriculum materials and resource personnel to K-12 public school teachers and administrators, higher education faculty, special interest groups and the general public. The Center is designed to enhance communication and coordinate environmental education activities between the Universities, colleges and local, state and federal agencies in Oklahoma and the Southwest.

The educational activities of the Center are organized into a variety of programs as opposed to courses. Graduate credit is offered in all teacher education programs. The majority of these ongoing programs also provide scholarships to qualified participants. The programs are designed to reflect unique delivery systems and break from the traditional course scheduling. They range from short one and one-half day awareness workshops to intensive 8:00 a.m. to 5:00 p.m., month-long study periods combining on-campus and field experiences. Field experiences range from one-half day to five days and involve Oklahoma's various ecosystems and resource management practices.

Emphasis is placed on Environmental Education as it applies to all school subjects and not as a new or additional school discipline to be

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studied. In all programs the desirable features of outdoor study sites and field trips are studied and explored.

In addition to the Natural Resources and Environmental Education Center programs the Graduate Faculty in the agriculture, biological, social, physical, and engineering sciences cooperate in offering graduate programs with an emphasis in environmental studies at the doctorate and masters level. Graduate level education degree candidates participating in Center programs integrate environmental studies with their education degree requirements. The breadth of offerings at OSU afford great choice and flexibility to the student interested in any aspect of environmental concern.

NATURAL RESOURCES AND ENVIRONMENTAL EDUCATION PROGRAMS

Specific Ongoing In-Service Programs

Multidisciplinary Outdoor Environmental Education Workshop Each semester a one and one-half day teacher's workshop is conducted to introduce in-service educators to the methods and curricula materials associated with environmental education. The overnight workshop is held at Camp Redlands and stresses the development and use of local school grounds as environmental study sites. Attendance ranges from 25 to 40 teachers who receive one hour credit in Curriculum and Instruction Education 4560, Teaching Competencies in Outdoor Environmental Education. Available in spring and fall semesters.

Colorado Environmental Education Program[1] Beginning in 1974 and continuing on an alternate year schedule a two week or more temporary systems model for teachers is conducted at the OSU Geology Field Camp near Canon City, Colorado. Participants receive three hours graduate credit from any of three cooperating universites. The intensive program involves water basin studies, curricula, backpacking, production of multidisciplinary Environmental Education study materials and soil, air, and water quality. The two-week program is designed to apply temporary systems theory in directing human resources and energy to solving environmental education problems. Offered in late July.

Conservation Education Leadership Training Program[2] This intensive four-week program is designed for K-12 teachers and administrators wishing to initiate or improve a multidisciplinary outdoor environmental education program in their school. Instruction takes place at strategic locations throughout Oklahoma as well as on campus. Participants may receive up to seven hours graduate credit as they receive practical experience with prominent Environmental Education curricula and upgrade their environmental studies background. In cooperation with the 88 Oklahoma Conservation Districts the student may receive a tuition scholarship. Offered during June.

Energy Awareness Work Conference The Energy Work Conference is for educators wishing to obtain knowledge of energy exploration, production, consumption and conservation as it relates to private industry, government and the consumer. The three-week program offers scholarships to Oklahoma teachers and administrators interested in energy issues. Offered as part of the summer schedule.

Graduate and Undergraduate Environmental Education Practicum[3] Since 1975 the Natural Resources and Environmental Education Center has cooperated in the design and implementation of the adventures beyond the classroom program. The multidisciplinary program involves approximately 300 sixth grade pupils each semester and provides an opportunity for both undergraduates and graduate college students to gain experience using teaching methods unique to outdoor environmental education studies. The three to six day field experience allows environmental education students to put theory into practice. Offered each semester.

Special In-Service Programs

Environmental Science Seminars The primary emphasis of the specific Environmental Education Programs is awareness, curriculum, methods, materials, and organization of public school environmental education programs. Needs assessment pointed out the desire of teachers to upgrade their environmental science subject matter content background. To achieve this objective a series of seminars held throughout the academic year puts the classroom teacher in contact with environmental science specialists. Researchers in the area of soil, water, air, population, nutrition, etc. present eighteen, three hour seminars to approximately 40 teachers. A major objective of this in-service program is to extend and expand the summer education component into the academic year where science content can be emphasized.

The Environmental Science Seminars, coordinated through the Center for Natural Resources and Environmental Education take place at three strategic locations in Oklahoma. In addition to OSU, seminars are conducted at Northwestern Oklahoma State University and East Central Oklahoma State University. The current program is supported by a National Science Foundation grant, as was a 1977-78 program. At this time support is requested for a three year extension of the Environmental Science Seminar series. Participant support is in the form of tuition, books, mileage and field trip meals.

Quachita National Forest-Environmental Education Program Beginning in 1977 the OSU College of Education's Natural Resources and Environmental Education Center piloted a study to (1) determine the feasibility of using recreational

motivating educational activities to teach environmental concepts to family campers and (2) offer the program to educators, and other special groups.

During each of three summers the project staff worked with thousands of people. The data gathered indicated that such a program is indeed feasible and that the level of environmental awareness and knowledge possessed by the public participating was significantly increased.[4]

Water Resource Management Simulator Training Program In 1977, fifty water experts and qualified educators were brought together to evaluate and make recommendations for a national water education position paper. The conference included an assessment of Oklahoma's water education needs. The assessment highlighted a need for water education information dissemination and teacher training. In addition, a statewide survey of water experts further identified the need for water resource education.[5]

In response to the need, Center staff have cooperated in the development of environmental teaching aids, particularly in the area of water education.[6]

The Natural Resource and Environmental Education Center in cooperation with the Water and Power Resources Service conducts two day teacher training programs for users of the Water Resource Management Simulator. The simulator is an interactive computer which simulates hydrologic conditions in a hypothetical river basin. An approximate maximum of thirty persons interacting with the computer through small consoles distributed to the audience manipulate and make decisions concerning basic variables and factors governing the quantity and quality of water in the river basin. The computer memory provides the audience with a history of their energy, livestock, irrigation, municipal/industrial, and reservoir management practices. Both pre and post simulator classroom materials are studied as part of a multidisciplinary unit on water.

Teacher participants receive a $30.00 stipend, and one hour of graduate credit for successful completion of the program. Following training the Water Resource Management Simulator is made available to the teacher for classroom use in Junior and Senior High Schools.

Additional In-Service Activity The Natural Resources and Environmental Education program interfaces with a number of state and federal agencies with common goals. Center staff conduct training programs in cooperation with the Oklahoma Wildlife Federation, U.S. Forest Service, Oklahoma Conservation Commission, and State Department of Education. In addition Center Staff conduct an average of five workshops per year at the request of local school systems.

Program Methods and Techniques

With the exception of the Environmental Science Seminar series, all programs include:

1. a multidisciplinary approach
2. a sensory awareness component
3. "hands on" participatory activities
4. a balance between content and education methods
5. extensive field work
6. a blend of theory and practice
7. learning in a relaxed atmosphere with human as well as environmental interaction
8. considerable change in pace using a wide variety of instructional modes
9. written assignments with practical value in the participant's school
10. periodic communication with past program participants
11. the use of former participants as resource personnel
12. opportunity for participants to learn from each other
13. the use of state and federal resource personnel

The above techniques are employed in varying degrees depending on the nature and length of the program. Specific methods include field trips ranging from one hour to five days in length, simulation games, lecture, small group and individual projects, laboratory activities and time to explore and preview literature and audiovisual materials in the Natural Resources and Environmental Education Center library.

Program Feedback

Formal research assessing the success of specific ongoing programs has been completed for the Conservation Education Leadership Training program, the Graduate and Undergraduate Practicum and the Quachita National Forest - Environmental Education Program. Specific information concerning the results of these studies may be obtained from the publications cited in the list of references. Overall the assessment of program achievements has been most positive.

Current formal research includes the development and pilot of an instrument to determine the level of understanding of water related concepts possessed by graduating high school seniors and a study of the nature and scope of concepts achieved by participants interacting with the computerized Water Resource Management Simulator.

ENVIRONMENTAL SCIENCE PROGRAM

Purpose and Objectives

The College of Education, Department of Curriculum and Instruction offers the following masters and doctoral degrees as part of an all university environmental science program coordinated by the Graduate College.

Study Options The breadth of offerings at Oklahoma State University afford great choice and flexibility to the student interested in any aspect of environmental concern. The student integrates environmental studies with work in the department of Curriculum and Instruction. The multi-faceted nature of environmental problems and need to prepare for work in a multi-disciplinary mode are the basis for requiring competence in an area of specialization and a broad perspective of other environmental science specialities.

The Master of Science Degree, with Environmental Science Option To obtain at M.S. degree with an environmental science option, the student must satisfy minimum degree requirements as specified by the department of Curriculum and Instruction. In addition, the student must take Environmental Sciences 5103 plus at least two additional courses having an environmental focus in a different field. Students must write a thesis (or a report) dealing with an environmental problem.

The Doctor of Philosophy Degree, with Environmental Science Option To obtain a Ph.D. degree with an environmental science option, the student must satisfy minimum degree requirements as specified by the Department of Curriculum and Instruction. In addition the student must take Environmental Sciences 5103 plus at least two additional courses having an environmental focus in a different field. A dissertation dealing with an environmental problem must be written.

The Master of Science Degree in Environmental Sciences To obtain a M.S. degree in Environmental Science the student must satisfy a minimum level of competence in a "home" Department. In addition, students must take Environmental Sciences 5103 plus twelve to fifteen hours credit in approved courses outside the discipline and distributed among the physical, biological and social sciences. Students must write a thesis or a report dealing with an environmental problem.

The Doctor of Philosophy Degree in Environmental Sciences To be eligible for the Ph.D. degree in Environmental Sciences the student must have a master's degree in an environmentally-related field. In addition, the student must have a "home" Department in which minimum doctoral level requirements are satisfied. Environmental Sciences 5103 must be taken and a program of study which includes 15 to 25 hours of courses in other disciplines must be approved by the Environmental Sciences Steering Committee as well as the student's doctoral committee. A dissertation dealing with an environmental problem must be written.

Environmental Science 5103 Environmental Problem Analysis
This is a course offered each spring and is required of all students seeking environmental sciences degrees at Oklahoma State University. It involves multi-disciplinary team investigation of environmental problems. Problem formulation, review of applicable theory from different disciplines, data collection from field, library and laboratory, mathematical modeling and application of appropriate techniques of analysis to selected environmental problems.

Adjunct In-Service Activities

In cooperation with the Oklahoma Conservation Commission, the Center houses the Commission's Conservation Education Specialist. The role of the Conservation Education Specialist is to promote sound environmental education in grades K-12. Using the resources of the Center and those of the 88 Conservation Districts in Oklahoma the specialist provides consulting services at the school site. The consulting service follows teacher participation in university environment programs and is designed as a practical extension of the formal in-service program.

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3. Mills, Terence J. "Meaningful Learning in Outdoor Environmental Education," The Journal, Ohio Council for Elementary School Science, Vol. 12, No. 1, November, 1980.

4. Bost, Ronald L. "The Use of Recreational Activities to Teach Environmental Concepts to Family Campers." Unpublished Dissertation, College of Education, Oklahoma State University, Stillwater, OK, May, 1979.

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6. Environmental and Conservation Instructional Activities, Oklahoma State Department of Education, 1977.

7. Garuba, Sandra S. "A Comparison of the Relationship Between a Multidisciplinary Outdoor Environmental Education Experience and the Perceptions of Educationally Involved and Uninvolved Students." Unpublished Dissertation, College of Education, Oklahoma State University, Stillwater, OK, December, 1978.

CENTER FOR ENVIRONMENTAL AND OUTDOOR EDUCATION PROGRAMS FOR PRESERVICE AND INSERVICE EDUCATORS: BEMIDJI STATE UNIVERSITY

by Ray Nelson and Dave Guba*

Although the Center for Environmental and Outdoor Education does not currently offer a major per se, the Division of Education at Bemidji State University includes in its major programs the option of taking the concentration of 12-18 credits in Environmental/Outdoor Education through the Center's program. While theory and methods courses are offered on campus, many of the Center's courses are offered at other sites in the Bemidji region. The variety of course offerings spans the teaching continuum from lecture style to the discovery approach in education.

The general purpose of the Center for Environmental and Outdoor Education is to provide an Environmental and Outdoor program for pre-service and in-service educators from both formal and non-formal educational institutions and organizations, community leaders, interested individuals, and school children at all levels.

One goal is to help people to become aware and knowledgeable about the environment, as well as active in maintaining and improving the quality of the environment.

Another of the goals of the Center is to help people to become outdoor environmental leaders in wilderness, rural, and urban settings within a wide framework of programs sponsored by such agencies and organizations as schools, nature centers, parks, and resorts.

Goal accomplishment is attained through combining the Environmental and Outdoor Education concentration with one of the established degree programs. These degree programs lend themselves well to the interdisciplinary approach of Environmental and Outdoor Education, and the related outdoor recreational skills. Some specific major programs include Community Service, Elementary Education, Secondary Education, Physical Education, Park and Recreational Planning, Communications Media/Environmental Interpretation, and Environmental Studies.

Major programs at the University, with the consent of the department chairman and advisor, allow students to concentrate in Environmental and Outdoor Education. The concentration consists of a minimum of 12 to 18 hours of environmental and outdoor education courses and directed

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electives. The following are academic areas in which electives may be taken from: 1) bio-physical sciences, 2) humanities, 3) behavioral sciences, 4) recreation, and 5) fine arts.

The Divisions of Education and Physical Education include in their major programs the option of taking the concentration of 12-18 credits in Environmental and Outdoor Education. Students wishing to combine a knowledge of Environmental and Outdoor Education with personal certification as a teacher should consider these majors.

The Center for Environmental and Outdoor Education offers a concentration of courses which include:

Introduction to Environmental and Outdoor Education
Organization and Administration of Environmental and Outdoor Education
Field Experiences in Environmental and Outdoor Problems in the Environment
Internships in Environmental and Outdoor Education
Independent Study in Environmental and Outdoor Education
Curriculum in Environmental and Outdoor Education
Energy in Education
Project Learning Tree
Outdoor Biology Instructional Strategies
Autumn Natural History
Survival and the Man-Nature Relationship
Winter Environmental Interpretation
Winter Botany
Winter Wildlife
Basic Skills in Rock Climbing
Foods from the Wilderness
Wilderness Inquiry--Quetico, Ozark Mountains, Hawaii, Black Hills, Norway, Scotland
A Process Approach to Environmental Education
Nature Photography
Blacksmithing
Log Cabin Constructing
Orienteering
Canoeing/Kayaking/Camping . . .

Some courses are offered on campus, while others are taken at the Bald Eagle Outdoor Learning Center or the Bemidji State University's Hobson Forest. Credit hours vary depending on the course. Courses are also offered at various sites throughout Bemidji State University's service region.

Instruction spans the teaching continuum from lecture style to the discovery approach in education. Methods include audio-visual aids, demonstrations, problem solving, and experiencing. Safety and experiential learning are two major components of our courses.

Course evaluations by the participants and instructors are one measure of our success. Another is the continuous inquiry by interested students. Some courses have waiting lists and require extra staff.

The development and implementation of a major in a degree program at Bemidji State University is an objective for the future of the Center for Environmental and Outdoor Education. Approval for an undergraduate major in Environmental Education was received as this paper went to press. A master's proposal (non-certifiable) is now in progress.

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A VIRGINIA PROGRAM IN ENVIRONMENTAL EDUCATION: VIRGINIA RESOURCE-USE EDUCATION COUNCIL

by Bernard L. Parsons*

For the past 25 years, Virginia teachers have had the opportunity to enhance their knowledge of environmental and natural resource conservation concepts by participating in a three-week course offered at four locations across the state by the Virginia Resource-Use Education Council. Topics covered during the course include: 1) geology, soil and water conservation, 2) forestry, 3) wildlife, and 4) marine life. Approximately one-half of the course is devoted to field trips and laboratory sessions.

Overview of the General Purposes of the Program

During the past 25 years considerable progress has been made in the Virginia public schools toward the development of environmental educational programs. This effort has been materially enhanced by an environmental and natural resource conservation course organized by the Virginia Resource-Use Education Council. This course is for public school teachers and others and has been taught at four locations during the past 25 years.

When the council embarked on a teacher training program in the summer of 1956, 29 Virginia teachers were given scholarships for a three-week course of instruction in various aspects of Virginia resources. Those successfully completing the first program at Virginia Polytechnic Institute and State University received either graduate or undergraduate credit toward renewal of their teacher's certificate or other purposes. Money for the scholarships was contributed by many Virginia industries, interested Virginia organizations, and private individuals. Enthusiastic response to the initial course encouraged the council to expand the program in 1957 to The College of William and Mary and in 1958 to the Virginia State University and to several other colleges after that time. At the present time, the course is being offered at the Virginia Polytechnic Institute and State University, Virginia State University, Longwood College, and The College of William and Mary.

To date, more than 2000 Virginia school teachers have completed the course; it is estimated that they have taught more than a million Virginia school children during that time. The objective of the course is to help the teachers do a better job in presenting environmental concepts in the classroom. Sound natural resource education takes on

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*Prof. Parsons is the Director of the Conservation Course offered in conjunction with the Virginia Resource-Use Education Council at Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

ever-increasing importance as our citizens must make complex resource and environmental management decisions. The course is aimed at teachers, supervisors, and administrators and other interested persons, including leaders of resource related associations and members of local planning commissions who are encouraged to attend the course; and the ordinary citizen is also welcome.

Credits for the course are as follows:

Virginia Polytechnic Institute and State University	5 quarter hours credit
The College of William and Mary	4 semester hours credit
Virginia State University	3 semester hours credit
Longwood College	3 semester hours credit

Description of the Courses Included in the Program

Geology. Teachers are taught how geological forces have shaped the earth's crust and study the mineral from which it is made, learn about valuable minerals and where mineral deposits are located in Virginia, study water as it shapes the earth's surface and learn how it serves the needs of man.

Soil and Water Conservation. The soil is the cornerstone upon which our whole civilization is built. In the course we teach how the soil itself was formed, how its processes work, and how it is being protected and conserved. The teachers are also taught the role of the watershed in providing stable water supplies.

Forestry. The dynamic forest at work is taught in the course and the teachers go on field trips to the living forest and see how they can be directed for the benefit of man. They follow wood as a raw material and see the variety of products that can be made from it and learn the ecological and recreational benefits of the forest.

Wildlife. The teachers are taught about the native animals of Virginia and how the economic and aesthetic value improve the well-being of all Virginians. They study the roll that wildlife plays in maintaining balance in nature and see how wildlife populations can be managed and controlled.

Marine Life. Marine life is given an especially important place in the environmental course and teachers examine the marine environment, meet residents face to face, learn about the ecological forces that work along our coast, in our marshland estuaries and inland streams and lakes.

Methods and Procedures Used in the Program.

This resource conservation course is taught over a three-week period with approximately one-half of the time spent in the classroom and the other half devoted to field trips and laboratory sessions so that the teachers can get a hands-on experience and see how conservation and the environment work in our everyday lives. The course is spread over a three-week period and five tests are given; one at the end of each of the major subject mentioned. The course is a must for teachers who want to bring environmental studies into the classroom or governmental and civic leaders who must make decisions affecting the environment and private citizens who want to be better informed or just want to explore natural systems.

Measure of Success

The best way to measure the success of the course is to read the testimonials that some of our students have made:

> "This is the best course that I have taken. You have offered us excellent teachers, fantastic activities and an opportunity to take back our experience so that we can help others to become more aware of the need to conserve"!
>
> Charles Barksdale, Jr.

> "I think testimonial(s) written by several teachers could be included in the brochure next year so that other teachers could hear exactly how valuable real people think the course is".
>
> Josie R. Lovelady

> "In all of my college experiences, I have not taken a course that I feel was as helpful to me as the course I have just completed. I know that I am much better prepared to teach conservation after having had instruction from the many well qualified persons whom you secured for this course. I am grateful to you for your choice of instructors and for the way that you set up the course."
>
> Helen N. Joyner

> "You are now becoming relevant. You will do your 'thing' in this class. You will snap, crackle and pop. This class will do everything for you but grow hair if you are bald headed. It is for those who think young and have a lot for which to live. Seriously, this class will make a better teacher, worker, or person out of you, and you will never be the same again. And it will be the most painless dose possible even though you will be in class session six hours daily. Never have I enjoyed a study situation more. If you are a housewife, you will love the added benefits of dormitory living with no meal cooking or dishes or housework

to speak of. You will cherish the friendship and associations gained here as you eat, study, go on a real hay ride, take a bus trip to a fish hatchery, go into the forests, enjoy recreation on a picnic together, and dig for rocks. The teachers are people whom you will come to appreciate thoroughly for their dedication to their fields of interest. When you hear the one on geology, it will become the most important thing, then it will be on soil, or forestry, or wildlife. They become completely involved and you get taken up into it with them."

Nell Thompson

"You must surely know that it would be unlikely that any teacher could attend a conservation short course and be unable to incorporate basic attitudes of conservation in everything she does--in the classroom and out. I think this is probably the greatest benefit of the three weeks of intensive exploration. I teach about 150 seventh graders general science at Monroe. The children have been 'getting the word' pretty generally. Our study was along the lines of library research, group reporting and individual reports, film suggestion and classroom instruction. I used the conservation pledge as a general line of approach and the areas of reporting were taken from that. Our final project was a poster from each child depicting some phase of conservation or a project along the same lines. The technique was certainly rank amateur, but the ideas developed were very nice indeed. We have been exhibiting the posters for all to see--especially since some hundred odd posters covered all available space and marked out into the halls. Before we begin to accept them as permanent landscape to be looked around, I think they will go to each homeroom teacher for her 'pat on the back' and then home. In the meantime, we are including a film further exploring the subjects begun here on the average of once a week. About eighty of my children have professed to be interested in the wildlife essay contest. (They're being bribed with an extra grade, but most of them are really excited about it.) I can't thank you enough for the work at VPI. Most of my senior Girl Scouts serve as program aides for younger girls. Partly to refresh them on the subject, I used the Audubon 'Bon the good word' flannel board conservation story and suggested they use it in their troops for Natural Resource Conservation Week. At least one of them did this. Had there been time to get it done, it would have been valuable to have more material on hand. Next year, I will be more prepared--I hope."

Mrs. Frederick Whittaker

"In my present unit, I am using material from the geology section and soil section. I am sure I will be using much more of the material during the year. I highly recommend the course and would very much like to promote perhaps having such a course on the high school level. I will pass along the

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literature and do my best to encourage others to take it in the coming year as I have found it not only interesting but an invaluable reservoir from which I will be able to draw aid in teaching. Thank you all again for the opportunity you have given to participate in the program."

Norma C. Brunk

"I am still learning from the conservation course. Every day and everywhere I go there are reminders of things needing to be done. The fourth grade children whom I teach this year are beginning to know about some of the resources, how to use them wisely and why. Currently, we are doing a unit of study on water as a resource, why and how it is important to us, how we may help to keep it pure, etc. Thanks for the opportunity to learn things to share with my pupils."

Mrs. Etholene Whitlow

Future Plans

As for our future plans, we hope that interest will increase in the course as the general public becomes more aware of our environmental needs and that the courses will be taught in the years ahead. In a speech made by one of our state conservationists recently, the following statement was made:

"The development of civilization has been a long slow tedious process. Many people today can lay little claim to having reached the state of perfection. Of course, the contrast by the human affairs in the United States of America today and primitive man existence of say 4-5 thousand years ago is impressive. It is an axiom, however, that what man creates man can destroy. Civilization is now at the crossroad. Whether it turns to the right and leads to a greater achievement and a haven of human existence or hastens in its present course to destruction and final obliteration depends on which road is selected."

It is hoped that this course and other courses of a similar nature will enable the people of the United States and, yes, the people of the world to make the right choice and that we will be able to provide food, shelter, and clothing for the world population in all years yet to come.

NATURAL RESOURCE-ENVIRONMENTAL EDUCATION TEACHER CERTIFICATION PROGRAM: MICHIGAN STATE UNIVERSITY

by R. Ben Peyton*

The undergraduate environmental education program at The Michigan State University has four major thrusts: 1) environmental science, 2) sociology and economics, 3) natural resource management, and 4) pedagogy. Although successful completion of the program yields teacher certification, the number of Michigan schools employing environmental education teachers has been limited; thus, changes in the Natural Resource-Environmental Education program are presently being considered.

Program Overview

The Natural Resource-Environmental Education curriculum is an undergraduate program offered as a certified teaching major or minor in Michigan. The program was initially established by the College of Agriculture and Natural Resources in 1972. Certification in secondary education was approved by the Michigan State Board of Education in 1973.

Currently, the program is offered by the Departments of Fisheries and Wildlife, Resource Development, Forestry, and Parks and Recreation. Students may specialize in any of these four and receive the B.S. degree from that department. The program is administered by a coordinator,[1] with advisors appointed in each cooperating department.

Generally, the Natural Resources-Environmental Education curriculum (180 quarter-hours) attempts to provide students with foundations in each of several areas:

1. Environmental Science
2. Sociology and Economics
3. Natural Resource Management
4. Pedagogy

The Natural Resource-Environmental Education curriculum is not designed to produce only natural history or outdoor education specialists. However, competencies in these or other areas may be achieved by use of electives, departmental specialization, and/or selection of a teaching minor (or

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major). The interest is to produce graduates who are knowledgeable and skilled in the processes of environment problem identification, investigation and solution. Further, graduates should be competent to teach environmental education in either interdisciplinary (e.g., single environmental education course) or multidisciplinary (i.e., infusion) formats. Graduates are certified to teach ecology, environmental science, or environmental studies at the secondary level.

Enrollment in the major climbed to a peak of 180 in 1975-1976, making it the third largest teaching major in the university. Numbers have steadily declined since then to the current enrollment of 70.

Natural Resource-Environmental Education Curriculum

The requirements for the Natural Resource-Environmental Education major are described below. The Natural Resource-Environmental Education minor requires the same core courses and education courses as the major, but differs in that students in the 36 credit Natural Resource-Environmental Education minor must take a total of only 14 credits distributed among three of the five departments listed. In addition, they need not fulfill the College requirements unless their teaching major is in the College of Agriculture and Natural Resources.

REQUIREMENTS FOR THE MAJOR IN NATURAL RESOURCES AND ENVIRONMENTAL EDUCATION

University and College Requirements

	Credits
American Thought and Language	9
Social Science	12
Humanities	12
College Algebra and Trigonometry	5
Chemistry (through Organic Chemistry)	11
Introduction to Economics	4
Two Communication Courses	6

Requirements for Natural Resources and Environmental Education

A. Core Courses

IDC 200	(Resource Ecology and Man)	3
RD 301	(Conservation of Natural Resources)	3

PRR 344	(Leisure and Recreation Resources)	3
FW 305	(Principles of Fisheries and Wildlife Mgt.)	3
FOR 202	(Introduction to Forestry)	3
FW 484	(Outdoor Environmental Education)	4
FOR 491	(Natural Resources and Modern Society)	3

B. Specialization and optional courses within the College of Agriculture and Natural Resources. Specialization requires a minimum of ten credits within one course grouping. A minimum of ten optional credits must be divided between any two (or more) of the other four course groupings in this section. Specific courses selected are to be approved by the academic advisor.

Fisheries and Wildlife

FW 328	(Vertebrate Pest Control)	3
FW 374	(Biological Oceanography)	3
FW 376	(Introductory Limnology)	3
FW 485	(Environmental Conservation Program Design)	3
FW 424	(Wildlife Population Analyses)	4
FW 425	(Wildlife Habitat Analyses)	4
FW 427	(Wildlife Biology and Management)	4

Forestry

FOR 204	(Forest Vegetation)	5
FOR 220	(Plants and Their Environment)	3
FOR 301	(Quantitative Methods in Natural Resources)	4
FOR 304	(Forestry Ecology)	4
FOR 409	(Forest Hydrology)	3
FOR 424	(Forest Soils)	4
FOR 450	(Natural Resources Administration)	4
FOR 455	(Natural Resources Economics)	4
FOR 460	(Arboriculture)	3

Park and Recreation Resources

PRR 302	(Environmental Attitudes and Concepts)	3
PRR 304	(Designs for Recreation: Nature & Man)	3
PRR 351	(Environmental Interpretation I: Principles)	3
PRR 440	(Park and Recreation Administration)	4
PRR 446	(Park Area Operation)	3
PRR 448	(Field Studies in Park Administration)	3
PRR 449	(Recreation Land Management)	3
PRR 451	(Environmental Interpretation II: Methods and Devices)	4

Resource Development and Public Affairs Management

RD 417	(Land Economics)	4
RD 420	(Water Resource Development)	4
RD 435	(Law and Resources)	3
RD 460	(Regional Economics)	4
PAM 201	(Introduction to Community Economics)	3
PAM 260	(World Food, Population and Poverty)	3
PAM 406	(Public Expenditures Theory and Policy)	4
PAM 462	(Agriculture and Rural Development in Developing Nations)	3

Horticulture, Crop Science and Soil Science (optional)

HRT 201	(Fruits, Vegetables, and Ornamental Plants for Outdoor Home Planting)	4
HRT 211	(Ornamental Trees and Narrow-leaved Evergreens)	4
HRT 212	(Ornamental Flowering Shrubs and Broad-leaved Evergreens)	4
HRT 325	(Ornamental Plant Management)	4
CSS 101	(Crop Science)	3
CSS 202	(Soils and Man's Environment)	3

CSS 210	(Fundamentals of Soil Science)	5
CSS 331	(Soil Mangement)	4
CSS 390	(Soil Conservation and Land Use)	3

C. Minimum of 12 credits from at least two of the following areas, with specific courses selected to be approved by the academic advisor.

College of Natural Science

BOT 201	(Plants, Man and the Environment)	3
BOT 302	(Introductory Morphology)	4
BOT 318	(Introductory Plant Systematics)	4
BOT 336	(Economic Plants)	3
BOT 411	(Systematic Botany)	4
BOT 450	(Ecology)	4
BOT 410	(Terrestrial Ecology)	6
ZOL 304	(Biology, Behavior, and Man)	3
ZOL 389	(Animal Ecology)	4
ENT 250	(Pesticides and Environmental Quality)	3
ENT 301 & 302	(General Entomology & Lab)	5
ENT 404	(Field Entomology)	6
ENT 430	(Economics)	3
GLG 201	(Earth Processes)	4
GLG 202	(Evolution of the Earth)	4
GLG 205	(Oceanology-the Marine Environment and Man)	3

College of Social Science

ANP 100	(Origin of Man and Culture)	4
ANP 171	(Introduction to Anthropology)	4
ANP 250	(Culture, Environment and Adaptation)	4
ANP 263	(Origin of Civilization: Archaeology)	4

ANP 285	(Anthropology and the Modern World)	4
ANP 419	(Studies in the Anthropology in the New World)	4
ANP 473	(Culture and Personality)	4
GEO 205 & 206	(Physical Geography an Lab)	5
GEO 215	(World Food Issues)	3
GEO 307	(Geography of Environmental Quality)	4
GEO 320	(Geography of Population)	4
GEO 407	(Geography of Michigan)	4
GEO 429	(Landforms of North America)	4
SOC 241	(Introduction to Sociology)	4
SOC 251	(Social Psychology)	5
SOC 310	(Social Stratification)	4
SOC 329	(Urban Sociology)	4
SOC 332	(Behavior of Youth)	4
SOC 420	(Dynamics of Population)	4
SOC 437	(Rural Sociology)	4
SOC 477	(Complex Organizations)	4
UP 231	(Evolution of Urban Communities)	3
UP 400	(Urban Development and Planning)	3
UP 471	(Ecological Basis for Planning)	3

Interdisciplinary and Other Courses

IDC 201	(Introduction to Environmental Systems)	3
IDC 220	(The Politics of Ecology)	4
IDC 256	(Energy Consumption and Environmental Quality)	3
IDC 432 & 433	(Introductory to Meterology and Lab)	3

IDC 435	(Microclimatology)	3
UMS 221	(The Role of the Helping Professions and Organizations in Community Services)	4
UMS 402	(The Geography of the City)	4
UMS 413	(Urban Economics)	4
UMS 431	(Law and Social Change)	3
UMS 441	(Health and Environmental Quality)	3

Teacher Certification Requirements

ED 200	(Individual and the School)	5
ED 327	(Methods of Teaching Secondary Common Elements)	2
ED 327L	(Methods of Teaching Natural Resources, Environmental Education and Earth Science)	3
ED 436	(Student Teaching)	15
ED 450	(School and Society)	5

Teaching Minor: May be selected from the following: 30-36

Agriculture and Natural Resources
Anthropology
Biology
Business Administration
Chemistry
Coaching
Communication
Computer Science
Consumer Education
Dance
Driver & Traffic Education
Geography
German
Health Education
History
Journalism
Latin
Marketing
Mathematics
Music
Office Administration
Physical Science

Earth Science	Political Science
Economics	Religious Science
English	Russian
Family Life	Sociology
French	Spanish
General Science	Theatre

Specific requirements are listed in the College of Education Section of the Academic Programs Catalog.

Electives (variable credits)	
Total	180

Program Success

The effectiveness of the Natural Resource-Environmental Education program in achieving its objectives has not been formally evaluated. However, some trends in results seem apparent to those working with the program.

Graduates appear to be well trained as generalists in the environmental studies area. Those wishing to develop specialization in natural history interpretation, outdoor education or other related fields have been able to do so effectively. However, there is concern that the curriculum may spread students "too thinly" in some foundational areas such as the basic sciences (e.g., biological sciences). The small number of electives makes it difficult for students to achieve depth in all areas if they wish to graduate in four years (180 credits).

Many Natural Resource-Environmental Education students have found seasonal work in YCC (Youth Conservation Corps) programs and as interns in various environmental education camps (e.g., nature centers). Our observations of these students have provided some degree of measure of the Natural Resource-Environmental Education program effectiveness. Natural Resource-Environmental Education students have had notable effects in making the environmental education programs at some YCC camps more than a natural history awareness. YCC enrollees have been effectively exposed to all levels of environmental education from ecological foundations to environmental action skills. Natural Resource-Environmental Education students without strong electives in biology who work at nature centers have sometimes been at a disadvantage when an in-depth knowledge of natural history was required. Their use of education skills have generally been effective.

Perhaps the major problem confronting the Natural Resource-Environmental Education program is the employability of its graduates. At the inception

of the Natural Resource-Environmental Education major, it was anticipated that the environmental concern of the 1970's would result in an increased number of environmental education positions in Michigan public schools. The creation of these teaching positions has not taken place. As a result, primarily those Natural Resource-Environmental Education students with minors (or dual majors) in employable fields such as physical or earth sciences have found teaching jobs.

Of the 195 Natural Resource-Environmental Education graduating majors from 1973 to 1978, 18% (36) reported being employed as teachers soon after graduating. Another 43% (84) reported employment in non-school positions, 13% (26) were unemployed and 25% (49) did not respond to the surveys. No records are available to indicate employment rates two or more years after graduation. A more complete analysis of employment trends for Natural Resource-Environmental Education graduates has been reported by Dave Johnson ("Employment Trends for a Michigan Environmental Education Major", in Current Issues V: The Yearbook of Environmental Education and Environmental Studies edited by Arthur Sacks, and Craig Davis. ERIC Clearinghouse for Science, Mathematics, and Environmental Education, pp. 171-185, 1979).

There is no doubt that the declining enrollment in Natural Resource-Environmental Education is due at least in part to the lack of teaching positions in environmental education. The lessened emphasis on environmental issues in the late 70's has also contributed to the lower enrollment.

Future Trends in the Natural Resource-Environmental Education Curriculum

A number of changes in the Natural Resource-Environmental Education program are presently being considered. Some of these are briefly considered here.

1. Re-Organization of Natural Resource-Environmental Education Administration. The departments involved are considering making the program the responsibility of the Department of Fisheries and Wildlife, thus terminating the interdepartmental nature of the program. Most Natural Resource-Environmental Education majors (80-90%) have enrolled in the Department of Fisheries and Wildlife in the past. It would facilitate the program administration to concentrate the students in one department. Program changes (e.g., core course requirements) could be made more efficiently if they are the decision of one rather than all four departments.

2. Utility of the Natural Resource-Environmental Education Major. Through advising efforts, students are encouraged to either develop a dual major or use the Natural Resource-Environmental Education as a teaching minor rather than major in order to increase their employability. It is anticipated that a major in earth sciences would make the

graduate more competitive than an earth science minor. The goals of the Natural Resource-Environmental Education program can still be effectively achieved by the infusion of environmental education into the other disciplines taught by Natural Resource-Environmental Education majors and minors.

3. Addition of a Non-Teaching Option. The original Natural Resource-Environmental Education program included an option for students to build some strengths in areas not requiring a teaching certificate. This was terminated as an option in 1976-77. It now appears that such an option has value in allowing for more diversity in the program. Students wishing to combine training in environmental studies and communications, for example, could do so very well with a non-teaching Natural Resource-Environmental Education program. Consideration is being given to reinstating the non-teaching option for such purposes.

NOTE

1. Dr. David Johnson has been the Natural Resource-Environmental Education Coordinator since inception of the program.

ENVIRONMENTAL EDUCATION INSERVICE PROGRAMS: KANSAS STATE UNIVERSITY

by Terry J. Shaw and Glenn E. Francq*

The Kansas Advisory Council on Environmental Education (KACEE) has been designated by the Kansas State Legislature as the official advising body to the Kansas State Board of Education in the area of environmental education. KACEE and the Kansas State Board of Education are in the process of developing a five-phase State Environmental Education Plan for Kansas. Kansas State University has worked closely with KACEE in developing the Plan, and in assisting with environmental education needs assessments. Based on these needs assessments, Kansas State University is providing environmental in-service education for teachers through regular course offerings and funded programs.

Introduction

Awareness of environmental issues is a prerequisite leading to the cultural changes necessary for the resolution of environmental problems. The decision to make cultural changes is based on values which are shaped by socially transmitted information. Fostering this awareness of change in values will involve a concentrated educational commitment. Such an educational responsibility must be shared by a diversity of governmental and private organizations. This broadened investment by dissimilar sectors of society requires the development and implementation of a comprehensive environmental education plan.

In the mid 60's supervisors of Kansas Conservation Districts and other interested individuals expressed concern about environmental education needs of Kansas. The concensus was that awareness and understanding of environmental problems could best be achieved by an interdisciplinary thrust in the realm of environmental education. This implied the need for a unified effort on part of a single body representing a broad diversity of environmental concerns and issues. An organization of this type would be most effective in developing a meaningful environmental education effort for Kansas.

To reach this goal the Kansas Advisory Council for Environmental Education (KACEE) was formally organized in 1968. KACEE is currently comprised of seventy-two colleges and universities, professional organizations, state and federal agencies, businesses and industries,

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and public schools having interests in improving environmental education within Kansas.

An important step was achieved in 1978 when a concurrent resolution was passed by the Kansas State Legislature designating KACEE as the official advisory committee to the Kansas State Department of Education in the area of environmental education.

KACEE is currently involved with the Kansas State Department of Education in developing a comprehensive state plan to aid schools and other agencies in implementing environmental education programs. In addition to developing the plan, KACEE and the Kansas Department of Education are to aid schools and agencies in organizing environmental education programs, to provide in-service education and to distribute requested materials.

Environmental Education Plan for Kansas

The State Environmental Education Plan is being developed in five phases. Phase I, completed in 1979, identified the goals, objectives and plan of action for the development, implementation and evaluation of the State Plan. Phase II, completed in 1980, was the result of a state wide environmental education needs assessment conducted by Stallings (1980) at Kansas State University. Phase III, under present development, will provide curriculum and instructional models that integrate environmental education into the educational and everyday lives of Kansas citizens from kindergarten to adult. The third phase includes a coordinated effort of the Kansas State Department of Education and member organizations of KACEE for (1) developing or adopting material for integrating environmental education within public school curriculum, (2) developing a means of providing improved environmental education in-service education for public school teachers, (3) investigating possibilities for incorporation of an environmental component into the undergraduate teacher preparation curriculum and (4) developing plans involving KACEE member organizations in providing resource people and information to promote activities which will improve the understanding regarding environmental issues by the general public and public school students. Phase IV will involve KACEE and the State Department of Education assisting educational institutions, governmental agencies and community groups in coordinating the implementation of environmental education programs. Phase V will be an ongoing evaluation of the total environmental education program at all levels.

Goals and Objectives of Kansas' Environmental Education Plan

The goals developed in Phase I of the State Environmental Education Plan are as follows:

1. To develop within each individual an awareness and appreciation of our environment and acceptance of responsibility for environmental quality.

2. To develop an understanding of one's relationship with his natural and man-made surroundings.

3. To be able to identify possible alternative choices and assess their benefits and risks.

4. To develop a desire and ability for problem solving and decision making concerning environmental issues.

In order to accomplish these goals, Phase I states that the following objectives must be met:

1. To integrate environmental concepts and activities into present school curriculum and educational programs of governmental agencies and community groups.

2. To develop material resource centers for those who are involved with environmental education programs.

3. To prepare educators to acquire skills and knowledge about content and approaches for environmental education.

4. To emphasize preservice education to assure that all future teachers will have a basic environmental literacy.

5. To develop guidelines for environmental education.

6. To assist schools and school districts in implementing environmental education guidelines through the involvement of students, parents, district staff and interested citizens.

7. To assist schools and school districts in identifying outdoor laboratory sites.

Kansas State University's Commitments

Considerable effort has been directed toward off-campus, in-service education in the area of environmental education by Kansas State University. Also, needs assessments have been conducted in the area of environmental education (James and Potts, 1978) and energy education (Langford and James, 1980). In addition, the Delphi Study (Stallings, 1980) was conducted for KACEE and the Kansas State Department of Education to determine which environmental concepts were viewed as being most important by public school teachers, administrators and environmental educators.

Based on these studies and the goals and objectives described by KACEE, courses have been developed to meet the needs of the teachers in the state of Kansas. Kansas State University's environmental education course and energy education course have been offered eight times in many locations within the state as well as on campus in the last three

years. In addition, the four-day KACEE sponsored workshop, utilizing the U.S. Forest Service materials, Investigating Your Environment, has been offered 13 times since 1975. This workshop is offered for one or two hours of graduate credit through Kansas State University or one of several other public institutions of higher education in Kansas.

These in-service courses and workshops are designed for K-12 teachers of any subject who are interested in incorporating environmental concepts into their multidisciplinary curriculum. The primary thrust are (1) to promote teacher awareness of resource materials which are available for classroom use to improve their students' literacy level and (2) to involve participants in information-gathering as well as problem-solving processes related to environmental issues.

The courses typically center around the inquiry mode of instruction and stress teaching techniques and strategies appropriate for environmental education. Simulation games and other activities are used to study environmental issues from a values standpoint.

These course offerings have consistently received favorable evaluation from participants. Participants stated that their level of awareness concerning the complexity of environmental issues and problems had been raised substantially. Also, the inquiry oriented teaching strategies have been described as being useful when applied to their technique of classroom instruction.

Components of Environmental Literacy

Hungerford and Peyton (1976) state:

> "The major objective of environmental education must be to develop an environmentally literate citizenry that is both competent to take action on critical environmental issues and willing to take that action."

They state that environmental literacy components can be classified under three headings: (1) cognitive knowledge, (2) cognitive process, and (3) affective domain. The current environmental education and energy education courses and the KACEE workshop have strong emphasis on cognitive process and affective domain but minimal emphasis is placed on cognitive knowledge.

Although it is recognized that a strong content base is important, courses which would improve teachers' cognitive knowledge are generally offered by colleges and universities only during the daytime, thus making it difficult for teachers to enroll. In addition, these courses usually deal with environmental problems and issues from a narrow disciplinary standpoint; i.e., an ecological, economic, geographical, sociological, or historical perspective.

The Stallings (1980) Delphi study was conducted for KACEE to determine environmental education needs as perceived by teachers, administrators

and environmental educators in Kansas. The following objectives are typical of those ranked most important by participants in the study.

The student will:

1. Describe trade-offs between environmental quality and standard of living desires, and make decisions necessary to protect the environment.

2. Demonstrate knowledge of the impact of environmental quality on personal health.

3. Describe the relationship between their consumer and life style decisions and energy use and demand.

4. Identify and locate sources of pollution in their community.

5. Formulate moral and ethical values in relation to environmental considerations and integrate these values into personal decisions regarding energy use, career choices, family planning, transportation, use of money, etc.

6. Demonstrate knowledge of the interdependence of man and his environment.

7. Demonstrate an awareness of the problem solving roles that pressure groups, politicians, and governmental entities can contribute to solutions for environmental problems.

8. Apply the concept that everything in the environment is linked together in a very complex system and that man-made changes in the environment can produce negative results.

9. Explain why environmental decisions must consider the economic, social, and political realities on a local, national, and international level.

The James and Potts (1978) needs assessment utilized a "Goals Instrument" that was distributed to a random sample of teachers and principals to establish what educators considered as appropriate goals for environmental education.

Some of the highest ranking goals from the 957 responses were as follows (in order or rank):

1. Students will demonstrate knowledge of an respect for environment.

2. Students will demonstrate recognition that they are a part of the environment and that they alter it.

3. Students will demonstrate an awareness and understanding of environment.

4. Students will demonstrate motivation and skill in solving environmental problems.

5. Environmental education will be integrated in school curriculum.

6. Environmental education will deal with local environmental problems.

Data from both needs assessments imply that teachers and administrators feel that teaching environmental concepts is important. The date also indicated that the approach should be interdisciplinary, that students should be encouraged to examine their own values as they relate to environmental issues and that curriculum should stress the application of concepts and values to real situations.

The Current Environmental Education Project

A National Science Foundation-funded environmental education project, designed to meet the above needs, is currently underway at Kansas State University. The current in-service project is directed toward thirty middle-level science and social studies teachers who reside within seventy miles of the Kansas State University campus.

The primary objectives of this project are to:

1. Improve the skills and knowledge of teachers with respect to

   a. their knowledge of environmental concepts, as well as the career opportunities open to students with interest in these areas,

   b. their ability to develop activities and use teaching strategies which are based on the characteristics and needs of the early adolescent learner,

   c. their knowledge of how environmental and social factors (economics, sociological impact of technology, values of a population, etc.) interact,

   d. their ability to apply this knowledge to local situations in order to make their curriculum more relevant,

   e. their ability and confidence in using non-formal methods of instruction (outdoor study sites, simulation games, role playing, investigating local environmental issues, community history, oral history, value clarification, etc.).

2. Provide a mechanism by which teachers will meet, interact with, and develop a working relationship with local scientists and resource people as well as university scientists and educators who share a common interest in environmental education.

3. Increase the use of local scientists and resource people in direct teaching situtations (classroom activities, presentation, etc.) and as sources of background information and materials for the teachers.

The instructional portion of the project consists of eighteen, biweekly, three hour sessions held throughout the 1980-81 academic year, five all day Saturday sessions, and a four day follow-up at the end of academic term.

Resource people and material used for the sessions are from several campus departments (Curriculum and Instruction, Biology, Geography, Economics, History, Nuclear Engineering, Physics and Entomology), KACEE member organizations (Soil Conservation Service, Audubon Society, Kansas Fish and Game Commission, Extension Forestry, Kansas State Extension Wildlife, Kansas 4-H Foundation, Kansas Grassroots Association, Save the Tallgrass Prairie, Inc., and Outdoor Biology Instructional Strategies Resource Center), the State Historical Society and the Environmental Protection Agency.

The diversity of resource people involved in the project enables the participants to examine environmental issues from several different perspectives. Initial sessions dealt with basic principles of ecology and limiting factors found in the environment. Following topics built upon this basic information while emphasizing economic, historical and sociological ramification of decisions related to the environment.

Whenever possible the subject matter has focused on the environmental issues and situations relating to Kansas. Topics pertaining to Kansas water problems, impact of mechanized agriculture, land use decision, alternative and traditional sources of energy and economic and environmental trade-offs have been discussed.

The project's participants have been exposed to these and other issues from the perspective of an economist, wildlife biologist, sociologist, historian, Presidential energy advisor and organic farmer. The ramifications of various environmental problems have been discussed along with possible solutions and constraints. For example, although mechanized argiculture provides food at low prices, is livelihood for thousands of people, and has raised the standard of living of many rural areas, it is a monoculture ecosystem requiring extensive use of chemicals, is energy intensive, changes the soil characteristics and reduces wildlife populations.

Each session is begun with an interview conducted by the project director asking the resource speaker questions relating to educational and career opportunities in the speaker's vocation. This is done to better acquaint the project participant with a variety of environmentally realted careers.

The Learning Cycle Instructional Model

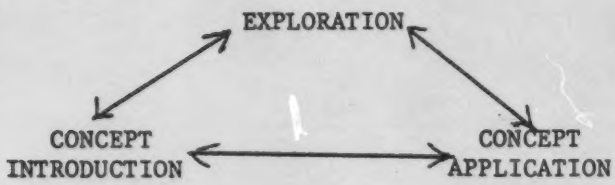
Participants experienced activities demonstrating the "Learning Cycle" model which is described by Karplus, et al., (1977). The "Learning

Cycle" is based of Piagetian learning theory which gives the student an opportunity for concrete experiences prior to the instruction of theoretical concepts.

The model is based on three separate instructional components. The first being "Exploration" which requires students to experience a concrete, minimally structured, exploring activity. "Concept Introduction" is the second phase where experiences from "Exploration" are clarified so that students may invent relationships for themselves aided by the instructor as needed. The third phase, "Concept Application", gives the student an opportunity to apply newly invented concepts to a new problem solving situtation.

Figure 1

THE LEARNING CYCLE



One series of activities in the project designed around the "Learning Cycle" instructional model was "examining soil resources." The "Exploration" phase consisted of a field trip to several sites with varying soil characteristics. Soil profiles were examined and participants were asked to develop several hypotheses related to soil formation, deposition and succession. The "Concept Introduction" phase involved instruction during the field trip and additional instruction given during a later class session. The "Concept Application" phase used a land use simulation game where participants were requested to apply the knowledge of soil types and soil use restrictions to a problem requiring land use decisions. In turn, the simulation game was the "Exploration" phase for later sessions on land use planning.

Evaluation

A Fleetwood Environmental Attitude Inventory (1972) and an author-designed Level of Use Inventory are being used in a pre-test, post-test design. The instruments are intended to measure changes in (1) the participants' attitude in relation to environmental problems and (2) level of use of local situations, resource people and various environmentally related resource materials.

Future Plans

A similar but expanded program is proposed for the 1981-82 academic year. This program will use the Telenet Communication Network to disseminate weekly sessions to approximately twenty sites across Kansas, thus allowing an opportunity for more participants to take part in the project.

Several approaches are being considered by KACEE for future activity. These include: (1) a writing conference where environmental educators will develop or adapt curriculum materials specified to Kansas issued and problems, (2) endorsing and aiding development of a broader spectrum of teacher in-service workshops, (3) methods of encouraging institutions of higher education to incorporate environmental education into the teacher education curriculum and (4) informal educational strategies aimed at the general public.

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ENVIRONMENTAL EDUCATION FOR TEACHER EDUCATION: IOWA STATE UNIVERSITY

by Thomas Tanner*

The environmental education activities described herein include a new undergraduate course which attracts about forty to fifty percent of Iowa State University's elementary education majors, extension service to teachers throughout the state and beyond, and an MS program and summer workshop which, to date, are serving central Iowa teachers more than any other geographic or professional population.

The Institutional Context

Iowa State University (ISU) offers a variety of environmental studies opportunities for students in education. Among the courses which various departments offer to non-majors, for instance, are insects and man, resource recovery, world food problems, social behavior and environmental resources, geologic environment and hazards, energy and the environment, plants and civilization. The science methods course in elementary education contains some environmental content. For several years, the college of education has conducted two energy education projects for in-serive teachers: a nine-month course during the academic year, and a summer session in which instructional materials are written.

In addition to these examples, there is one division of the university which has specific responsibility for this area. The environmental studies program was established early in the 1970's so that interested students might gain an integrated, holistic command of environmental concepts. Students enrolled in the program obtain any of the usual majors in any department, but also take an individually planned, multidisciplinary array of environmental courses. In each case this includes a selection from various departments, such as the classes named above, plus certain of the five integrative courses which are offered by the environmental studies faculty. Currently, this faculty consists of two full-time and about eight part-time persons, the latter having their major teaching assignments in such departments as physics, philosophy, and economics.

The second of the two full-time positions was created in 1977. Many of the responsibilities associated with this position have been in teacher education; likewise, most of ISU's distinctly K-12 environmental education activities have been initiated from and vested in this position, with a high level of cooperation from the college of education.

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These activities include a new undergraduate course for elementary education majors, extension service to teachers throughout the state and beyond, and an MS program and summer workshop.

The Undergraduate Environmental Education Course

Introduction to Environmental Education is a three-credit, one-semester course which was conceived with a chance remark in the fall of 1977. This quickly led to a series of discussions between faculty members of the environmental studies program and the elementary education department. A mutuality of interest was clear, and the course was offered experimentally to thirty-two students in fall of 1978 and sixty-eight in fall 1979. Approved then as a regular catalog course, it attracted ninety-two students in fall 1980.

To date, 165 of the 192 students have been elementary education majors. An analysis of enrollment according to year in school is presented in Table 1.

Table 1

Enrollment Analysis

	Year in School					
	1	2	3	4	5	Total
1978	28	4	--	--	--	32
1979	41	12	10	5	--	68
1980	36	15	19	20	2	92

The clear trend toward upper division enrollment is due to at least two factors. The course first became available in summer of 1978 when freshmen were registering; other students had pre-registered in spring and were gone for the summer. The subsequent trend indicates that students are now fitting the course into their plans one or two years in advance. Indeed, the course limit was raised in summer of 1980 to make room for freshmen.

Since its inception on an experimental basis, the course has been a quasi-requirement in the elementary education curriculum. That is, it is one of a group of "related course" among which the students must choose. These are offered by departments other than elementary education, and include such titles as art education, children's literature, music in elementary education, and creative dramatics. Students must complete at least two of nine such courses.

Objectives and Procedures

While the course undergoes considerable revision each year, its basic philosophy and objectives have changed but little. It is really two courses, which correspond roughly to climatic conditions. During the first half of the term, when the weather is generally pleasant, we are frequently outdoors, sometimes with elementary-school children. At this time three fundamental goals prevail: attainment of specific environmental education teaching strategies in the outdoors, experience in leading children in active small-group learning activities, and gaining the concept of learning by inquiry and active investigation. For example, university students first identify campus trees with a simple key, receiving only limited guidance from the instructor. Later they lead small groups of children in a treasure hunt, in which some of the "treasures" are trees to be identified. With a ratio of two children to one university student, work is done in small independent groups which disperse over the study area, the university student in each group serving as a senior partner and co-learner.

This activity has been possible because of the superb cooperation of schools, teachers, and parents in the Ames area. In 1980, the ninety-two university students each spent two class sessions with children. The participation of sixteen teachers, numerous parent drivers, and 360 students from seven elementary schools allowed the ratio of two children per university student. Since some schools have now participated with as many as four grades for three years, we have worked out a vertically articulated set of investigations which provides each grade with a different experience. Currently the instructor is also writing a set of related activities which the teachers may use back at school if they so desire.

In addition to these two class sessions, each university student also spends a day with Project ECO of the Ames public schools. Every weekday two buses take groups of children to any of several local sites for outdoor adventures and investigations. This program is also vertically articulated so that every Ames child has different ECO experiences each year, from grades K through nine. In September and October, as many as four university students from the class accompany an ECO teacher-naturalist on each bus. This has emerged as a mutually beneficial relationship. The ECO day is the item most frequently reported as students' favorite activity in the course. (A humbling reality for the instructor, who can lay no claim to its success.) Reciprocally, the ECO teacher-naturalists are enthusiastic about the student helpers, and even declare that some days just wouldn't have succeeded without them.

As the weather turns colder the class turns indoors, and becomes quite a different course, based upon the premise that all the outdoor activities in the world are of limited value if the teacher does not understand why s/he should be doing them. Now, the major objective is that students should become acquainted with a number of audacious ideas, provocative premises, and confounding concepts. Whether students choose to accept or reject them is, of course, their own business. They are:

The ultimate goal of environmental education is the modest one of saving the earth; there should be some elephants, some energy, and some clean water left for our grandchildren.

The penultimate goal of environmental education is the creation of a citizenry which will actively resist environmental deterioration. Preliminary research indicates that many citizens who do so, literally fell in love with the world of nature at an early age, through much unstructured and unsupervised play in the outdoors.

Such citizens face tremendous political and legal barriers; their task requires energy, scholarship, and sometimes even a good deal of courage.

The issue of environment *versus* energy, jobs, or economics may be a false one. Perhaps if we were doing the right things environmentally, we'd be doing the right things economically as well.

Governmental and corporate entities may or may not act in the public interest; citizen groups must be vigilant; an attitude of lassitude is inadequate for the protection of either environmental quality or civil liberties.

In many ways, the prognosis for earth is bleak. However, the planet still retains considerable beauty, resources, and rejuvenescence. The use of appropriate technologies might help us to get from here to there with grace.

It will be clear at once that some of these theses probably distinguish this from most other environmental education courses. That is one reason for their inclusion -- because the student may not have the opportunity to encounter them elsewhere. The course syllabus lists some of the vehicles for dealing with them:

> "Lectures" will include films, small-group discussions, and other features. Topics will be chosen from among the following:
>
> The Case of Glen Canyon Dam. Three films, small-group discussions, lecture.
>
> The Case of the Bighorn Sheep. Slides-cassette, lecture.
>
> Controversies about Energy: Nuclear, Synfuels, Solar. Up to five films, plus cassettes and lectures.
>
> Navajos and Energy Development. Film, slides-cassette, brief lecture.
>
> The Great Dismal Sawmp. An example of conservationist-government-corporation cooperation. Lecture.
>
> Planet-Planning. Reading, small-group discussion.

The Work of Citizen Conservation Groups. Brief lecture.

How Citizen Conservationists Got That Way, and What It Means for Education. Lecture, small-group discussions.

Major Vegetation Zones of the United States and the World; Characteristics and Problems. Maps, lecture.

Environments Elsewhere; Characteristics and Problems. The instructor's slides of East Africa, Guam, the Mt. St. Helens area (pre-eruption).

Map-Reading. Work with maps of Holst Forest and/or the Ames area.

Or Other Topics As Appropriate.

The case study approach which is employed is illustrated in this writer's set of studies titled *Of Democracy, Truth, and, Courage,* available from the National Audubon Society.

Reading requirements for the course have changed each year. In 1980 each of the two required books was read throughout the entire term, providing two very different threads of continuity. One book was this writer's *Ecology, Environment, and Education;* the other was Edward Abbey's *Desert Solitaire.* The former was used as an introduction to issues in both environment and environmental education. It was discussed in class and represented on all three examinations. The Abbey book gave students contact with a unique mind, a combatant environmental ethos, and writing which was humorous, colorful, angry, and entertaining. It appeared in all three exams but was not discussed in class, since the instructor felt that Abbey expressed himself with perfect clarity; no discussion could amplify or improve upon his words.

At its commencement the class was perceived by staff of both environmental studies and elementary education as a vehicle for freshmen to experience active involvement with children. But as demand for the course has grown among juniors and seniors, we have been mindful of the diverse population it now serves. Some will have had education courses and extensive contact with groups of children, others not. Some will have completed their general education or liberal studies courses, others will only have begun them. Thus, we have tried to teach content, concepts, and teaching strategies which are likely to be new to all the students. The simple outdoor teaching strategies are not full-blown lesson plans and require no prior knowledge of lesson planning. The very low ratio of children to university students creates a non-threatening stituation for our freshmen, yet seems satisfactory for more experienced students.

Evaluation and Future Modifications

At the conclusion of the course, students write anonymous evaluations of the class and instructor, and suggestions for improvement. In order to gain an easily quantified measure, two items were added in 1979 and 1980, asking students to grade the course according to how interesting and useful it was. Results are presented in Tables 2 and 3.

Table 2

Student Evaluations of Course Interest

	A	B	C	D	F
1979	33	28	6	--	--
1980	31	47	11	--	1
Total	64	75	17	--	1

Table 3

Student Evaluations of Course Usefulness

	A	B	C	D	F
1979	32	25	9	1	--
1980	29	43	14	4	--
Total	61	68	23	5	--

These are consistent with the written comments about both the class and the instructor. While the results are satisfactory, it can be seen that there was some slippage from 1979 to 1980. In 1980, the most frequent suggestion was to employ a greater variety of activities which the students can use both in and out of the classroom. The instructor concurs, recognizes that this is not his area of great[illegible] expertise, and is currently working to expand his repertoire of such activities.

A final word on the undergraduate program. The elementary education department requires that its students complete fifteen semester credits in an area of concentration. In 1978 it suggested environmental education as such an area. A curriculum was worked out and approved that year. To complete the program, the student must take introduction to environmental education, one other course offered by the environmental

studies program, and three additional courses from an approved list, which includes the examples given in the opening paragraph of this article. A few people have begun to declare environmental education as their concentration area; it is still too early to predict whether it will attract significant numbers away from such established and popular areas as art, music, and mathematics, the culturally different child, and some eleven others.

Graduate or In-Service Teacher Education

The environmental studies program tried a number of generally successful experiments in this area in the early- and mid-1970's. In more recent years our activities have evolved in three directions: non-credit extension offerings, which have proved popular, plus an MS program and a summer workshop which are both directed to moderate numbers of students. Here, we have an ironic situation. ISU is called upon to provide its expertise at meetings and conferences, but its high academic standards are a disadvantage in the competition for tuition-paying students.

Summer Workshop

Workshops were conducted on campus in the summers of 1978, 1979, and 1980, with enrollments of nine, eight, and twelve, respectively. Twenty-three of the twenty-nine participants have been teachers, including eighteen elementary; twenty-five have been Ames residents or daily commuters from other central Iowa communities. (The most notable exception to these rules: a public information officer from Venezuela's Department of Natural Resources, whose agency funded her summer journey to the U.S. to take this course.)

The 1978 workshop was two weeks long, but participant evaluations encouraged us to expand to three weeks in each of the next two summers. Class is conducted from 9 a.m. to 4 p.m. each weekday, and some home study is also required. Participants earn the equivalent of one semester credit per week. (Certain other institutions give as many as three, which is equivalent to awarding a baccalaureate degree after one and one-third years of post-secondary study.)

The workshop is similar to the undergraduate course in that some of the same confounding concepts, provocative premises, and audacious ideas are examined, via some of the same case studies and lectures. It differs in that contact with children is deemed unnecessary, and participants are given time to examine our collection of K-12 instructional materials instead. They clearly welcome this opportunity, and utilize it fully to select materials and teaching strategies for their immediate use. Also, each workshop has included at least one full-day field trip and a number of guest instructors, the latter about equally divided between "content" persons and "methods and materials" persons. The major objectives of the workshop are to expand the participants' repertoire of teaching strategies and their knowledge of environmental issues,

problems, and potential solutions. The anonymous evaluations indicate that the workshops have been considered a success, both for elementary and secondary teachers.

In the future this workshop will probably be offered every second or third summer, a frequency appropriate to the level of demand for the course.

MS Program

The establishment of a master's degree program in environmental education was considered by a committee of interested faculty members between 1978 and 1980. It was decided that client demand and faculty resources suggest a different path, at least for the time being. We will utilize the existing program leading to the MS in Education, and will probably serve teachers in central Iowa, for the most part. A program of thirty semester credits is about equally divided among educational foundations, curriculum, and multidisciplinary environmental studies or environmental education. Typically, this writer would be the major professor, and would be the candidate's supervisor or instructor of record for the summer workshop, an independent study project, and the thesis or creative component. The program of study for our first student was recently submitted and approved.

Extension Activities

As Iowa's land grant university, ISU has a venerable tradition of extension service to the state. In keeping with this tradition, some resources of the environmental studies program have been allocated to this service. Specifically, this writer has been able to accept invitations to speak or conduct sessions at meetings of Iowa teachers. Between August 1977 and December 1980 this duty has meant twenty-six sessions at twenty meetings, plus keynote addresses at three others. These non-credit sessions, other than the addresses, have ranged from fifty minutes to three hours in length, and typically are attended by twenty to thirty persons. (The range for those on which data were retained is five to eighty-four, the latter being the total for two identical sessions at one meeting). The topics have usually been case studies of specific environmental issues; instructional and background materials are typically distributed in order to make the sessions practical and useful for the teachers attending. The host organization usually shares with ISU the cost of travel and materials.

The concept of extension service has been taken beyond state boundaries to include workshops or sessions at several national meetings. Calendar year 1980 provides several examples of invited presentations: a paper on environmental education for citizen action, for the Council of State Social Studies Specialists; a one-and-one-half day case study workshop, National Association for Environmental Education (NAEE); a very well-attended symposium on environmental education for citizen action, NAEE.

A third type of extension activity occurred during 1979, with funding from the U.S. Office of Environmental Education. Six two-day case study workshops were conducted around the state, attended by a total of 154 teachers and twenty-six other educators. The State Department of Public Instruction and the fifteen area education agencies participated in planning and teaching the workshops.

Anonymous evaluations were gathered in many of the thirty-eight sessions described above; these confirmed that participants were usually well pleased.

Conclusion

In early 1977, K-12 environmental education at Iowa Sate University consisted of occasional units in scattered courses, and a non-tenure-track opening at the assistant professor level. Today there is a more solid base of ongoing activity, thanks to the support and cooperation which the environmental studies program has received from the college of education and other units of the university, and also from other organizations and agencies.

PRESERVICE/INSERVICE PROGRAMS IN ENVIRONMENTAL EDUCATION: MIAMI UNIVERSITY

by Frederick J. Thomas*

Undergraduate students, regardless of major, at Ohio's Miami University may elect to minor in environmental education. As a part of the Environmental Education minor, students participate for two semesters in a program with elementary school children and are responsible for all aspects of planning, implementing, and evaluating outdoor learning experiences.

A Master of Environmental Science degree is offered through an interdisciplinary unit within the Graduate School, the Institute of Environmental Sciences, with a strong emphasis on an interdisciplinary, problem-solving approach.

Undergraduate Minors

Miami University has offered an undergraduate minor in Environmental Education since the mid-1970's, with the program open to all undergraduates regardless of major. The minor was largely an outgrowth of the student-initiated Peffer Western Environmental Education Program (PWEEP), through which Miami students provided outdoor learning experiences for students of area elementary schools. Administered by a Coordinator of Environmental Education in the Department of Teacher Education, the minor has always involved faculty members from the Departments of Educational Leadership, Zoology, Botany, Geography, the Institute of Environmental Sciences, and from other parts of the University. The academically rigorous minor still retains the student-run PWEEP program as its cornerstone.

Originally, the Environmental Education minor was directed largely towards preparing students for careers as naturalists in parks, zoos, museums, residential centers, and other non-school centers. Many of the students had majors in the natural sciences (most often in botany, zoology, or geology), but a significant number came from the School of Interdisciplinary Studies or from such diverse disciplines as anthropology and home economics. Many education majors (both elementary and secondary) also participated in the minor, even though it had been designed with other groups in mind.

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The number of students completing the minor has been rather constant at about eight or ten a year. A much larger number participate in different parts of the minor, particularly the PWEEP program which enrolls twenty-five to thirty students each semester. An important difficulty in attracting more students to complete the entire minor has been that they received virtually no official recognition beyond the listing of individual courses within the transcript. Very recently, Miami University has begun to acknowledge minors on transcripts as integrated programs, and the more official status should be beneficial.

The lack of recognition was perhaps even more discouraging for education majors, since the State of Ohio does not yet provide any acknowledgement of preparation in Environmental Education on its teaching certificates. In an attempt to change this situation and to improve the articulation between the teacher preparation programs and the Environmental Education minor, Miami has recently adopted two additional "tracks" for the minor, one intended for Elementary Education majors and the other for students in any of the secondary teaching fields. There seems to be good reason to hope the new tracks will be recognized soon by Ohio as leading to an Environmental Education endorsement on teaching certificates.

As minors, the Environmental Education programs at Miami are intended to supplement the major rather than to stand alone. In particular, the minors make no attempt to produce generalists who are familiar with all aspects of environmental issues. It is assumed the major has provided in-depth training in one discipline or profession (recall that students can combine one of the minor with any major offered by the University), and that the goals of the minor are:

1. Develop a further understanding of how the major can be related to environmental issues,

2. Develop an awareness of the contributions which can be made by other areas of knowledge, and to develop the ability to work cooperatively with people from other disciplines and professions,

3. Develop a personal set of understandings and beliefs and a personal life style which are consistent with a deep concern for the total environment and for all other people, and

4. Develop skill in the processes of doing environmental education with young people and adults.

Consider, for example, a student working for certification as a secondary social studies teacher. If this student elected the Environmental Education minor, he or she would be expected to become somewhat familiar with the types of contributions which ecology, physics, art, religion, and other areas can make in dealing with environmental issues, but the student would remain primarily a social studies education specialist. During seminars, in the PWEEP program, and in other experiences, the student would be encouraged to concentrate, say, on

the social aspects of land use--but always in close cooperation with students from other specializations. Such a person might later be called upon to teach a high school course in "Environmental Issues," but our real aim is to prepare teachers who can (1) integrate environmental education into their regular classes, and (2) serve as grassroots leaders in team-teaching or other cooperative efforts.

Program Description

Students in all three tracks of the minor (elementary education, secondary education, and non-school education) are required to participate for at least two semesters in the Peffer Western Environmental Education Program. Under a faculty adviser and a paid student director, students in PWEEP are responsible for all aspects of planning, organizing, implementing and evaluating outdoor learning experiences for about 1000 elementary students each semester. All Miami students in PWEEP work directly with the elementary students during at least eight field trips in a semester, and also each Miami student serves on one of the PWEEP committees. The committees are responsible for such tasks as producing a newsletter, visiting and otherwise communicating with schools prior to field trips, preparing programs for each field trip, and revising the manual of activities. In addition, experienced PWEEPers take on many responsibilities in training newcomers, both through semi-formal workshops and classes and through apprenticeship methods. Grades are assigned for this experience by the faculty adviser, using a process that includes a good deal of self-evaluation by the students.

Reflecting the multidisciplinary backgrounds of students, the PWEEP programs for elementary children include a broad range of activities, from fairly traditional nature study through to Acclimatization and simulation activities. The ultimate goal is always to improve environmental quality by increasing the children's awareness and understanding of their environment and by guiding them towards an appropriate evironmental ethic.

The other core requirements for all three minors consist of three courses (totalling eight semester hours) which are normally taken at the junior or senior level. One of these is an "Environmental Education Seminar," in which students are guided in formulating and expressimg their personal beliefs about the goals and methods of environmental education and about the environment generally. The second core course (like the seminar, taught through the Department of Teacher Education) is a methods/practicum course, "Teaching Environmental Education." It emphasizes the skills of planning and conducting environmental education activities, both in classrooms and in other settings.

The other core course is "Introduction to Environmental Science," offered through the Institute of Environmental Sciences. The course is multidisciplinary, in that it involves professors from many departments in explaining the contributions which their fields can make to environmental issues. The course goes on, however, to develop an interdisciplinary methodology which shows how the different perspectives can be combined in making environmental decisions.

Students in the "non-school" track complete their minor with a course on the administration and operation of outdoor education facilities and with three courses covering environmental biology, environmental physical science, and conservation of natural resources.

Students in the elementary education track also take the environmental biology and conservation of natural resources courses. All elementary education major are required to take a full year environmentally oriented physical science course, so the minor has no additional requirement in that area. The administrative course is replaced with a requirement for "three credit hours of electives as approved by the Coordinator of Environmental Education." The intention here is to give each student greater depth in a content area which is personally interesting and environmentally important.

Students in the secondary education track are required to take a course in either the administration of outdoor education or curriculum development in environmental education. In addition, they must take "six credit hours of electives from outside the major teaching field, as approved by the Coordinator of Environmental Education." Again, the intention is to provide serious familiarity with another field of knowledge which is both personally interesting and environmentally important.

Some Comments and a Look at the Future

The program is a very good one--not so much because of the arrangement of course requirements, but because of the many faculty members and students who share their environmental concerns and ideas and actions with each other. That the program works is evidenced by the number of graduates who are functioning successfully in important environmental education positions throughout Ohio and the U.S.

In many ways, the prospects seem good for growth and improvement. Most obviously, the recent establishment of official recognition by the University for minor programs such as those in Environmental Education and the likelihood of state endorsement of teaching certificates should encourage more students to complete the minor. An even more important trend may be a gradual but continuing shift from what is perhaps an over-emphasis on the natural sciences towards a more fully interdisciplinary program. The minors began in response to the initiatives of students in the PWEEP program at a time when many of those students were majoring in science and were wanting to become naturalists. It is interesting to note that the present enrollment in PWEEP has become much broader, with about a quarter of the students, for example, coming from the School of Business. With their help, we are making progress in incorporating the important perspectives of economics, marketing and management.

There is, at least, one problem. The program has been fortunate in having a Coordinator of Environmental Education, whose duties were included as a part of his official load. This person has been responsible for teaching most of the education courses in the program,

as well as for serving as adviser to PWEEP and generally coordinating the minors. Unfortunately, because of illness and then budgetary and staffing decisions, the position has been a rather unstable one, filled by four different people in six years. The future of the position remains uncertain, but it is to be hoped that the duties can be distributed somewhat more widely and that there will be more continuity in the leadership of the programs.

The shape of the program may change greatly during the next few years, but the basic strengths of the faculty, students, facilities, and alumni make it likely that Miami University will continue to produce competent and dedicated environmental educators.

Master of Environmental Sciences

The Institute of Environmental Sciences (IES) is an interdisciplinary unit within the Graduate School of Miami University which offers a Master of Environmental Sciences (M.En.) degree. The program philosophy emphasized a systematic approach to environmental problem solving and effective communication. Environmental Education is one of the Areas of Concentration available to students within the M.En. degree program. Students selecting the Environmental Education Concentration are generally interested in leadership roles, either in the public schools or in other educational organizations. The program usually requires two years of full-time work.

There is a strong emphasis throughout the program on an interdisciplinary problem-solving process (Fig. 1). During the first year of the program, a sequence of core courses provides an introduction to environmental science, experience in environmental measurements, environmental problem solving, statistical and mathematical analysis, environmental impact assessment, and policy making and administration. An important objective of the core curriculum is the development of respect for and understanding of the various disciplines involved in the solution of environmental problems.

In order to strengthen their understanding of the problem-solving process and to promote the development of interdisciplinary skills, all students work during their first year of a major, year-long student-team project. The projects mix students from different backgrounds and put them in substantive contact with faculty members, government officials, and community leaders in order to solve a problem. This community service emphasis, coupled with environmental problem-solving techniques, is a basic IES concept.

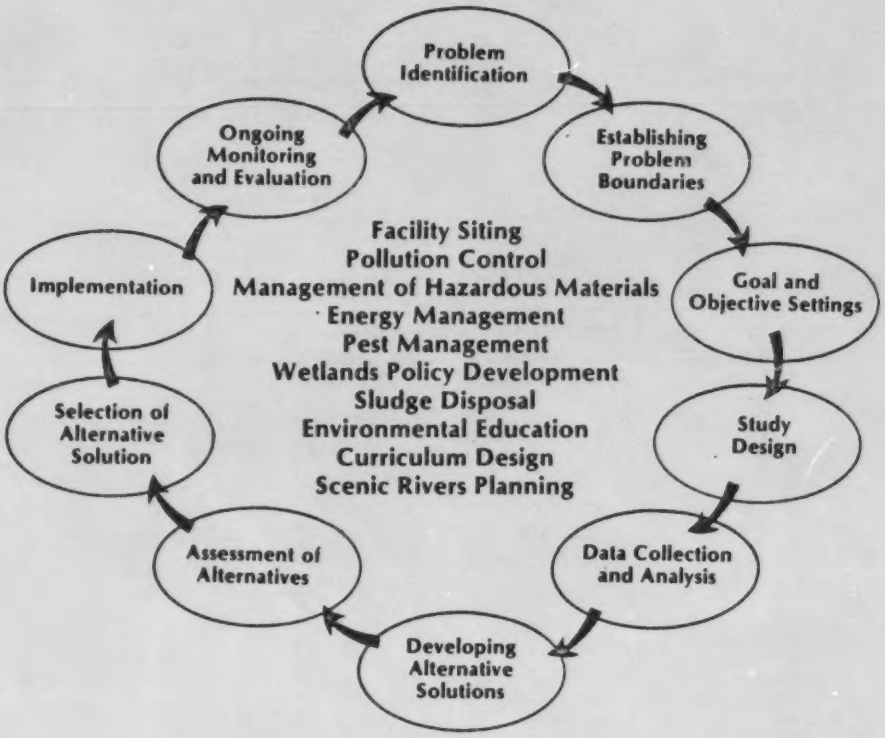

Figure 1. The Problem-Solving Process.

The second year of the program is devoted primarily to the Area of Concentration and to one of the research options, a practicum, an internship or a thesis.

The Concentration in Environmental Education consists of two semesters of an "Environmental Education Seminar," a course in either "Methods of Teaching Environmental Education" or "Curriculum Development in Environmental Education," and at least three semester hours of electives approved by the student's major professor.

For their research option, about sixty percent of students have chosen the internship. Internships involve approximately a six-month commitment to a appropriate sponsoring agency which is actively involved in interdisciplinary environmental activities. Students normally work full-time with the agency and submit monthly progress reports to the IES. Internships have been with school systems, with a variety of state and national agencies involved in educational activities, and with other environmental education organizations.

Overall, the M.En. program provides very strong training in interdisciplinary solving of environmental problems. It is recognized, however, that the Environmental Education Concentration is an area in need of improvement. There are generally no more than two or three students per year in the concentration, so the courses must be "multipurpose" ones which also serve other programs. The course in "Methods of Teaching Environmental Education" meets jointly with an undergraduate course of the same title, and it is sometimes difficult to accomodate the broad range of students present. The course in "Curriculum Development in Environmental Education" has so far been offered only as a summer workshop, and some IES students have been unable to schedule it at that time. The "Environmental Education Seminar" also meets jointly with an undergraduate class, but the broad range of student backgrounds may be more of an advantage in this case. So far, it has been possible to arrange good programs to meet the needs of individuals in the Environmental Education Concentration. In particular, the internships have proven very valuable. Still, the program of course work in Environmental Education needs to be improved.

TRAINING ENVIRONMENTALISTS: THE ANTIOCH/NEW ENGLAND GRADUATE PROGRAM IN ENVIRONMENTAL STUDIES

by Mitchell Thomashow*

Field-based and field-connected learning are integral to the Antioch/New England Graduate Program in Environmental Studies. Students may choose from three career tracks, including environmental studies, naturalist-educators, and specialists and consultants. Regardless of their chosen career tracks, all students take coursework in ecology, environmental quality, political economy, history and philosophy of environmental issues, and participate in two full-time internships.

The contemporary proliferation of environmental problems affects the ways in which people view the natural environment. As environmental deterioration becomes the reality of everyday life and thereby contributes to the decline of the quality of life, more citizens question the events and processes which contribute to this decline. Those questions inevitably elicit such notions as "awareness" and "ecological consciousness," as it is commonly assumed that if more people understood the roots and ramifications of environmental deterioration, it would be easier for them to effect "ecologically sound" policy.

The Antioch/New England Master of Science in Teaching program in Environmental Studies recognizes this challenge. We have developed a program that is based on several central social and environmental objectives:

- environmental awareness and ecological consciousness are necessary for the protection and survival of the earth and its inhabitants.
- environmental deterioration severely threatens the quality of life for all humans.
- ways need to be found to harmonize human activities with ecosystem processes.

Our view is that progress toward this "harmonization" is brought about by providing individuals with the knowledge and skills necessary to make individual commitments to life styles that result in the fitness of the environment for all life. We believe that this is best accomplished

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through intensive ecological field studies in diverse environments as well as concentrated academic studies and practical work experience.

As we have developed our training model we have been guided by the following questions: Who are environmental educators? Where do they work? Who do they teach? What should they study in order to become better teachers or advocates? What kind of practical experiences should they have?

We have assumed that environmental studies must be viewed as an interdisciplinary field with a broad audience. As professionals, environmentalists must be aware of the various approaches that are necessary to facilitate ecosystem balance. These approaches include: educational processes in formal and non-formal settings; the appreciation and application of various art forms that result in increased environmental awareness; and participation with individuals and organizations that are working to institute sound environmental policies and laws.

The purpose of this short article is to briefly describe the Antioch program, paying particular attention to our training model, our educational philosophy, and the program's academic content. The orientation here will also represent an informal case study as in the concluding section we will comment on our perceived strengths and weaknesses. The reader should be reminded that such an evaluation is inevitably biased by the author's position as program chairperson.

Who Comes to Antioch and What are Their Career Objectives?

Historically, we have been fortunate to attract an eclectic student body as our students have a wide variety of educational, experiential and geographic backgrounds.[1] Currently (1980-81) there are fifty students in the program. Typically our students are between 25 and 35, they have several years of experience in environmental studies and they come to Antioch because they've chosen to commit themselves to more concentrated and directed study. In some cases, we attract adult learners who are undergoing a career transition and wish to first enter the field of environmental studies.[2] The unifying theme is the intense commitment these people have as environmentalists. Their diverse backgrounds pose special academic challenges which we will discuss later.

Our program is designed to provide these students with the opportunity to prepare for educational and administrative positions within the broad field of Environmental Studies. Our students usually follow one of three particular career paths which lead them in the following directions:

> Environmental studies teachers who are qualified to teach in the areas of natural science, biology, environmental studies, or ecology at the secondary or elementary level.

Naturalist-educators who serve as teachers or naturalists at schools, nature centers, parks, and conservation agencies.

Specialists and consultants who combine skills in communication, advocacy, administration, and education in order to work for resource centers, conservation commissions, planning commissions and political action groups.

The program also provides advanced in-service study for educators who are professionally employed. This is especially useful for teachers who wish to redirect their teaching through an environmental approach.

Our students are encouraged to learn how to carve a unique "occupational niche." It is common knowledge that the environmental field is extremely competitive. We advise our students to learn how to discern and take advantage of various opportunities by learning how to establish an effective professional network and by learning how to convince others of the social value of their work.[3]

What Should Our Graduates Know to be Effective Professionals?

All of our students, regardless of their career tracks, are required to take Field Ecology (10), Ecological Theory (3), Environmental Quality (2), Political Economy of Environmental Issues (3), History and Philosophy of Environmental Issues (1), Biology (3) and Methods and Materials for Environmental Educators (2) as well as to participate in two full-time internships (see below).

The Field Ecology courses[4] are an important academic component. The purpose of these courses is to develop naturalist and interpretive skills so that the students understand both the ecological dynamics of a given area and can explain those dynamics to others in creative ways.

Ecological Theory, Biology, and Environmental Quality provide the theoretical scientific background for the field courses. Political Economy of Environmental Issues and History and Philosopy of Environmental Issues cover the origins of environmental deterioration and provide the students with philosophical, historical, and economic perspectives so that they can effectively formulate their philosophies of nature and understand the intricate balance between philosophy, politics, and education. We believe that all of these perspectives are necessry if our graduates are to develop a substantive and principled ecological consciousness that has social relevance.

Although we do not require a formal thesis, students are asked in the Methods and Materials for Environmental Educators course to compile and research a thesis-level project, and to demonstrate their knowledge in a public education setting. So rather than submit a formal thesis, they are asked to write an article for publication, lead a field trip for an environmental organization, lead a teacher training workshop, or conduct a project in any approved public setting. Our intention is to orient the students so that their work is relevant for a public audience.

These requirements represent our orientation and philosophy. All programs are individualized in that students can waive requirements if they have sufficient academic experience. Students are encouraged to participate in tutorials or independent studies depending on their specific interests.[5]

The Role of the Internship

Antioch might be perceived as a traditional alternative school. That is, it has utilized an alternative educational model for over one hundred years and the model has proved effective for many students in various fields and circumstances. That model is the integration of theory and practice, or the participation in an intensive work experience (internship) for a good part of a student's program. Field-based and field-connected learning are integral to Antioch programs because they provide a personal testing ground through which each student can apply directly the material presented in classes and can enrich classroom work with professional experience. Such learning offers students a continuing opportunity for two-directional feedback and experimentation.

The internship is an integral part of the student's graduate program. Students are encouraged to participate in work experiences which coincide with their professional goals. Consequently, students have interned with Audubon Societies, school systems, museums, environmental resource centers, alternative energy organizations, and in various other capacities. Professionally employed people in the program use their job as an internship and attend weekly classes at Antioch. These internships are typically full-time activities thus effecting the structure of the program's delivery system. Classes are offered on Thursdays, Fridays, and weekends enabling students to arrange their schedules so that they can take one or two days per week for classes.

Students document their internship experiences through a written journal, discussions of internship activities in a support seminar, and written essays reflecting on their experiences. Antioch faculty regularly visit students at their intership sites to further the integration between practical experience and academic courses. This supervision process is critical as students evaluate their role as practitioners and their role within organizations.

The balance between practical work experience and academic learning is delicate. Customarily, when students are involved in their internships, the work experience takes on tremendous importance and it does not leave them as much time as they would like for their classes. Moreover, their academic work becomes specifically oriented towards their work experience. Ideally, the theoretical academic work serves to organize the internship experience. But without useful supervision and introspection, students can neglect either their academic work or their field work. This is perhaps the most important issue for our faculty in their advisory roles. However, that tension, although it does create problems, is generally constructive and exciting and constitutes excellent professional preparation.[6]

The Graduate School and the Community

The Antioch/New England mission statement expresses Antioch's interest in maintaining an acute awareness of and responsiveness to Northern New England. The Environmental Studies program is interested in participating in as many community education projects that are relevant both for the graduate school and the community and that fall within the scope of its faculty expertise. Consequently, during the last several years Antioch, in conjunction with other regional organizations, has organized a series of community projects.

Through grants funded by the National Science Foundation and the Office of Environmental Education, the Department is active in two major projects: The first is aimed at the development of a tri-state (N.H., MA., VT.) indigenous resources technical assistance center which will investigate ways to attain greater regional self-reliance while balancing economic growth and environmental quality; the second involves designing and implementing a land-use curriculum in regional secondary schools. Several faculty members serve as coordinators for these projects with student interns working on the staff.

Antioch/New England and the New Hampshire State Division of Parks and Recreation have a working agreement by which the Environmental Studies Department coordinates all natural history research, environmental education and community activities for Pisgah State Park (located approximately ten minutes from Keene), the largest wilderness state park in New Hampshire. A newsletter focusing on issues directly related to the park is published on a quarterly basis by students in the Department, These projects provide students with excellent internship opportunities which actively involve them in natural history, environmental education, and public activities.

Effectiveness of the Antioch Program

The Environmental Studies faculty has two broad criteria for evaluating the effectivenss of the program. First, we ask the practical question: are our graduates attaining positions of leadership and are they effective in those positions? Second, we ask if the quality of their education is substantively sound.

We have been gratified to witness the development of a New England environmental education network that is heavily influenced by our graduates. Many of our graduates have rapidly achieved prominence in their field[7] as either educators, nature center administrators, environmental advocates, or naturalists. They are actively involved in planning and attending regional conferences and in contributing to and editing regional newsletters and other publications. We have assumed that this success can be attributed in part to their professional preparation.

Nevertheless, we are never entirely pleased with the quality control of our academic program. One of the major difficulties the program has to consider is how to maintain class content at an acceptable standard when

the class participants have such diverse backgrounds. Although the standard response to this problem has been that such interdisciplinary composition is enriching because it creates diverse perspectives, and to a certain extent that response has merit, the problem of diverse backgrounds is real. This places a great burden on the instructor who has to be sensitive to this problem. What is new for one individual may be remedial for another.

We have dealt with this problem by setting certain quality control standards and by adhering to them as strictly as possible. Students who require remedial work are either denied admission or are expected to acquire the necessary background on their own. In most cases, we have found that adult learners have the necessary commitment to follow such academic advice.[8]

The Antioch/New England Environmental Studies program has achieved a position of relative prominence in New England. Its struggle to achieve excellence requires an understanding of both the contemporary environmental situation and the changing nature of higher education. We are training environmentalists who have a difficult set of social and educational tasks. Our program attempts to provide the educational foundation and the support newtwork to facilitate environmental awareness and ecological consciousness.

NOTES

(1) If the reader is interested in the precise demography, he/she is encouraged to write to the Admissions Office at Antioch/New England.

(2) These students in transition are an interesting group in that they often are undergoing mid-life emotional transition as well. An evaluation of their academic and professional performance would be an interesting study in its own right.

(3) This problem has become particularly acute in recent years as the attitude of fiscal restraint has permeated many institutions. We have tried to respond to this by emphasizing practical occupational skills such as: grantwriting, financial adminstration, community organization, etc.

(4) These courses include: Ornithology, Mammalogy, Geology, Botany, Marine Ecology, Plant Communities, Nature in Winter, and numerous study trips to interesting habitats such as the Okeepenokee Swamp, Cape Cod, the White Mountains, Big Bend, etc.

(5) Each student's program will be organized according to his/her career orientation. For example, formal teacher training is satisfied through our New Hampshire State Certification program. See the appendix for a description of the requirements for each program track.

(6) The internship also serves to place students in a professional network that is useful in securing employment. We encourage students to attend conferences and to establish good reputations for themselves both within and outside the organizations they work for.

(7) A full list of our graduates and their job positions is available from the Environmental Studies program. Approximately 150 students have graduated from the program.

(8) The Environmental Studies program has been evaluated by the Mitau Commission, the New Hampshire Council for Teacher Education, the New Hampshire Post-Secondary Commission and by North Central Association of Colleges and Schools.

APPENDIX

MST Degree Requirements without Certification

A.	Environmental Systems Analysis Skills	24 credits
	1. Scientific Dimensions: (20 credits)	
	Biology (3 credits)	
	Ecological Theory (3 credits)	
	Field Studies and Environmental Analysis (Electives) (12 credits)	
	Environmental Science (2 credits)	
	2. Human Dimension: (4 credits)	
	History and Philosophy of Environmental Issues (1 credit)	
	Political Economy of Environmental Issues (3 credits) or	
	Social Policy (3 credits)	
B.	Communications and Administration Skills	3 credits
	Electives in this area (3 credits)	
C.	Professional Practice	8-10 credits
	Two Semesters of Environmental Internship with Professional Practice Seminar (8-10 credits)	
D.	Electives	2-11 credits
	Total Credits	40-44 credits

K-12 Biology Teacher Certification Requirements with Antioch Masters Degree

A. Environmental Systems Analysis Skills — 22 credits

1. Scientific Dimensions: (18 credits)

Biology (3 credits)
Environmental Science (2 credits)
Ecological Theory (3 credits)
Field Studies (Electives) (10 credits)

2. Human Dimensions: (4 credits)

History and Philosophy of Environmental Education (1 credit)
Political Economy of Environmental Issues (3 credits) or
Social Policy (3 credits)

B. Education Skills — 12 credits

Environmental Studies Methods and Materials (2 credits)
Environmental Studies Introduction to Teaching (1 credit)
Human Development (3 credits)
Philosophy of Education (3 credits)
Conceptual Development and Learning Theory (3 credits)

C. Profession Practice — 8 credits

One semester of Practice Teaching in Biology or Environmental Studies and a second semester in a Teaching or a general Environmental Internship.

Total Credits — 42 credits

K-12 Biology plus Elementary/Early Childhood Teaching Certification Requirements with Antioch Masters Degree

A. Environmental Systems Analysis Skills — 22 credits

1. Scientific Dimensions: (18 credits)

   Biology (3 credits)
   Environmental Science (2 credits)
   Ecological Theory (3 credits)
   Field Studies (Electives) (10 credits)

2. Human Dimensions: (4 credits)

   History and Philosophy of Environmental Education (1 credit)
   Political Economy of Environmental Issues (3 credits) or
   Social Policy (3 credits)

B. Education Skills — 22 credits

   Environmental Studies Introduction to Teaching (1 credit)
   Elementary Education Introduction to Teaching (1 credit)
   Environmental Studies Methods and Materials (2 credits)
   Methods and Materials in the Elementary Classroom (3 credits)
   Human Development (3 credits)
   Philosophy of Education (3 credits)
   Conceptual Development and Learning Theory (3 credits)
   Methods of Teaching Reading and Language (3 credits)
   Methods of Teaching Math and Science (3 credits)

C. Professional Practice — 8-10 credits

1. One Semester Internship in Biology or Environmental Studies Teaching, with Professional Practice Seminar (4 credits) and

2. One semester Internship in regular Elementary Classroom Teaching with Professional Practice Teaching (4 credits)

Total Credits — 50-55 credits

TEACHING MINOR IN ENVIRONMENTAL CONSERVATION: BALL STATE UNIVERSITY

by Donald E. Van Meter*

An undergraduate teaching minor in environmental conservation at Ball State University has a core requirement of four courses (16 quarter credits) and an additional twenty hours in natural resources subject area. This program, designed to interface with the university general education program, meets the State of Indiana's requirements and has shown a steady enrollment increase since its inception in 1976.

Ball State University was the first institution (1976) in Indiana to offer a teaching minor in environmental conservation. At the present time, 1980, 15 other colleges and universities in the state offer a teaching minor in conservation. These minors meet the licensing requirements of the Indiana Department of Public Instruction for Environmental Conservation.

Ball State's environmental conservation curriculum includes a number of Natural Resource courses specifically developed for this undergraduate minor. The curriculum also interfaces well with the university general education program and is designed to compliment many other teaching curricula.

The teaching minor has been designed to accomplish the following objectives:

(1) Develop an awareness, on the part of students, of contemporary environmental problems.

(2) Provide a basic understanding of natural resources and their role in meeting the needs of people.

(3) Motivate prospective and in-service teachers to plan and work toward achieving and maintaining a quality environment.

(4) Acquaint those enrolled in the minor with the opportunities to enrich instruction by integrating environmental conservation into the total curriculum.

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The Ball State teaching minor has a core requirement of four courses (16 quarter credits) which include a 100 level course, two 200 level courses, and one 300 level course. NR 101 - Introduction to Natural Resources-is designed to provide an orientation to natural resources, including environmental education. There are enough Natural Resource courses included in this curriculum to provide a unifying philosophy and integrated approach.

The courses constituting the teaching minor are as follows:

Required: 16 credits

NR 101 - Introduction to Natural Resources	4
NR 211 - Water Resources	4
NR 221 - Soil Resources	4
NR 395 - Methods and Materials for Teaching Environmental Conservation in the Secondary School	4

20 credits:

From Biological Sciences 4
- BIO 100 - Man and the Life Sciences
- BIO 313 - Ecology
- BOT 380 - Forestry
- ZOOL 483 - Wildlife Biology

From Earth Sciences 4
- GEOG 110 - Elements of Physical Geography
- GEOL 101 - Man and the Geological Environment
- NR 331 - Mineral Resources
- NR 341 - Air Resources

From Economics, Political Science, and Sociology 4
- SOC 470 - Population Problems
- POLS 130 - American National Government
- URS 200 - The Nature of Urban Life

From Special Areas 4
- NR 371 - Introduction to Outdoor Recreation
- NR 402 - Natural Resources of a Geographic Area
- NR 405 - Integrated Resources Management

From the Following Electives 4
- ANTH 100 - Introduction to Physical Anthropology
- CHEM 105 - General Chemistry for the Health Sciences
- EDCUR 400 - Curriculum Construction
- HSC 482 - Environmental Health
- LIB 422 - Audio Visual Materials
- PHYCS 300 - Environmental Physics
- PHYCS 380 - Descriptive Astronomy

As can be seen in the above curriculum, a total of 36 quarter hours must be earned for the minor. Between 20 and 24 credit hours are in the natural resources subject areas, with the remaining 12-16 hours in closely related disciplines.

Descriptions of the four required courses for the minor illustrate both competency in conservation/natural resource subject matter and in teaching skills.

NR 101 - Introduction to Natural Resources (4)

The role of natural resources and their relationship to man's social and economic welfare; population growth and its impact upon resource use. The nature and interrelationships of resources with emphasis on the multiple use concept of resource management. Laboratory and field work included.

NR 211 - Water Resources (4)

The hydrologic cycle as an integral part of the resource base and the relationship of water to other natural resources; its economic and social importance to man. Water conservation practices with emphasis on pollution abatement. Government and private participation and responsibilities in water conservation programs. Laboratory and field work included.

NR 221 - Soil Resources (4)

Soil as an integral part of our resource base and its relationship to other natural resources; its origin, development, and classification. The physical, chemical, and biological properties, with emphasis on the practical applications of soil science to natural resources planning. Laboratory and field work included.

NR 395 - Methods and Materials for Teaching Environmental Conservation (4)

The opportunities for enriching instruction by integrating environmental conservation into the secondary school curriculum. Sources of help in teaching environmental conservation including resource consultants, teaching techniques, and instructional resources appropriate to environmental conservation. Laboratory and field work required.

Envrollment in the environmental conservation minor since 1976 has grown steadily, if not dramatically.

Table 1

Enrollments in the Environmental Conservation minor at Ball State University

	1976	1977	1978	1979	1980
Number of Minors in Env/Cons	1	4	7	7	15

It is anticipated that enrollments in the Environmental Conservation Teaching Minor will continue some growth before leveling off. This minor compliments so many teaching majors and the subject matter is so important, it seems inevitable that student interest will grow in the coming years.

ENVIRONMENTAL EDUCATION—A COOPERATIVE EFFORT OF EDUCATION AND SCIENCE: UNIVERSITY OF MARYLAND

by Jack H. Wheatley*

Programs for in-service teachers are the core of environmental education at the University of Maryland at College Park. Outdoor education is emphasized in response to the needs of local school systems; the endeavor is made to provide expertise in both content and methodology appropriate to environmental education. Specific environmental education courses include an overview of the philosophy and methodology of the field, ecological principles and natural history, edible wild plants, and tours throughout the State of Maryland examining natural resources and their uses.

The University of Maryland at College Park provides an excellent setting for programs in environmental education due to the diversity of courses offered, its unique urban/suburban setting, and its easy access to natural environments from the ocean to the mountain. The center of environmental education activities at the university lies in the College of Education's Science Teaching Center and the College of Agriculture. Several faculty hold joint appointments in these areas and coordinate the interdisciplinary programs in environmental education.

The strength of the environmental education program at the University of Maryland lies in its programs for in-service teachers. Graduate specialization in environmental education is available in both the College of Agriculture and the College of Education; in Agriculture, the Department of Agricultural and Extension Education offers a Master's of science in environmental education while in the Science Teaching Center of the College of Education an environmental emphasis can be incorporated into all of the degree programs: M.S., Ed.D., and Ph.D. Each of these routes for in-service teachers is discussed below.

M.S. IN ENVIRONMENTAL EDUCATION

A Master's degree in environmental education is given by the Department of Agricultural and Extension Education with joint courses offered by the Science Teaching Center in the College of Education. The purpose of the program is to provide expertise in content and methodology appropriate for environmental education in the local school systems; because of these local needs, there is an emphasis on outdoor education. Also, a number

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of professional park naturalists are attracted to the program due to the out-of-doors orientation. The program was begun in 1975 with one student; currently there are 19 students involved in various stages. These students are primarily full-time professionals either in public or private school systems or in park systems and nature centers.

The environmental education graduate program is cross-disciplinary with students choosing courses from a number of areas, including biology, wildlife management, resource economics, education, geography, and more. The courses that deal specifically with environmental education form an unofficial core for the students and are taught by faculty with joint appointments in the Science Teaching Center and the College of Agriculture. These course are:

Environmental Education This course takes a look at the philosophy and methodology of the field with primary emphasis on the role of environmental education, curriculum development, value clarification, and multi-disciplinary approach. Through field visits to school outdoor education centers, county parks, and private educational organizations, the role and philosophy these organizations are studied. Free and inexpensive resource material available to teachers is examined and critiqued. Students explore current research findings and curriculum development through a series of contemporary readings. The course culminates with the development of an environmental education program or curriculum for specific site, such as a local school or park.

Teaching Ecology and Natural History In this course, classroom discussion of principles of ecology and natural history are accompanied by field work in several types of natural communities. The students write research reports comparing these various areas. Identification skill and date collecting techniques are used as means of gathering information in the natural areas, and potential resources and instructional materials useful in teaching ecology and natural history are surveyed. The students learn that ecology, and environmental studies represent a unique area of interdisciplinary study that is appropriate at all educational levels and in a variety of disciplines, social studies, language arts, fine arts, mathematics, and science.

Living off the Land The primary emphasis in this course is placed on the study of ways to utilize natural plants during camping experiences, hikes, and field trips. Also explored are means of integrating natural materials into the classroom for developing conservation concerns and practices. Slides, specimens, and field walks are utilized for the purpose of identifying edible, useful, medicinal, and poisonous plants found primarily in the northeastern United States. Natural animal resources are also discussed as are survival and camping techniques. The terminal activity for the calss is a weekend of "living off the land" with students bringing only their bedrolls.

Conservation of Natural Resources Designed specifically for in-service teachers, this course provides a study of Maryland's natural resources. Through numerous day and over-night field trips, students visit sites where natural resources are being utilized, including seafood packing plants, wildlife reserves, active and reclaimed strip mines, marble quarries, forest habitats, poultry industry, scenic vista, operating lumber mills, heavy industry, and much more. The second portion of this six credit course deals with constructing curricular materials around these field experiences; the teachers develop and present environmental programs for use in their individual schools.

In the Master's program these courses are supplemented by a set of research courses - Quantitative Statistics, Research Methodology, and Graduate Seminar - and by courses which meet an individual's specific needs. This latter group of courses are generally of two types: educational methodology and environmental content. The courses in methodology include curriculum development, media evaluation, and program planning and evaluation. In the content area, students choose from among courses in soil-water pollution, ecology, ornithology, energy and the environment, resource economics, wildlife habitats, and many more.

The graduate students put their course work and previous experiences to work in the development of their Master's research thesis or problem. In 90% of the graduate programs the students choose a Master's problem because this provides them with the flexibility to do research on highly localized issues. Some recent Master's problems have included a survey of visitor knowledge in nature centers, the development of a 4-6 Grade outdoor education program, a study of clientele characteristics in local parks, the development of program materials for the Urban Park and Recreation Recovery Program (U.S. Department of Interior), and an evaluation of a preschool nature interpretation programs based on content analysis of drawings.

Graduate Options in Science Education

The Science Teaching Center in the College of Education offers an environmental education option as part of all its graduate degrees. The major concentration is science education, but the student may choose from the same set of courses available in the College of Agriculture to include an environmental "minor." All of the graduate students in the program are in-service teachers or have had considerable teaching experience; many are broadening their content base to include environmental and outdoor education. The majority of these students are from local school systems where outdoor education is an important component; in fact, the two closest counties provide an outdoor, over-night experience for all their fifth or sixth grade students. These school systems, as well as other close-by school systems, run their own outdoor education centers, and a number of the graduate students are seeking state or county certification as outdoor specialists.

Undergraduate Science Teacher Education

The pre-service undergraduate program has a number of components in environmental education that are available to the students; most of these are mentioned above. Due to the number of requirements for state and national certification and accreditation, these components are not usually elected by the students. Certain environmental education components are incorporated into the required undergraduate curriculum; these include field studies in both botany and animal ecology.

Environmental Services Offered to Teachers

In addition to participation in the environmental education graduate program, the Science Teaching Center offers a series of environmental workshops for local schools and organizations upon demand. These include "Decision Making on the Chesapeake Bay," "Environmental Activities in the School Yard," "Environmental Studies for Elementary Schools," and "Field Work on Medicinal and Poisonous Plants." These environmental components can be adopted to specific classroom interaction by such workshop offerings as "Evaluation of Curricular Material," "Individualizing Instruction," "Attitude Assessment," "Science for Young Children" and others. The Science Teaching Center frequently serves as the sponsoring or facilitating agent for conferences and special events related to environmental education; recent conferences have been "Population and Environmental Education," programs for local school systems professional development, and others.

TEACHER TRAINING IN ENVIRONMENTAL EDUCATION: UNIVERSITY OF WISCONSIN—STEVENS POINT

by Richard J. Wilke*

Both pre-service and in-service teachers at the University of Wisconsin-Stevens Point can choose from a wide variety of programs in environmental education. There are, however, common objectives defined as expected behavioral competencies to be achieved by all participants. Included are courses in professional education, environmental education content, investigation and evaluation, and environmental action skills.

Environmental education has a long tradition at the University of Wisconsin-Stevens Point (UW-SP). In 1943 the first conservation education major in the United States was offered there. Over the years an outdoor education minor was added to the existing conservation education major. As conservation education and outdoor education evolved at UW-SP so did the entire conservation program. The result of this evolutionary process can be seen today at UW-SP which now has one of the largest Colleges of Natural Resources in the United States with over 2000 majors. The environmental education program at UW-SP is housed within this College.

Environmental education programs are offered at Stevens Point for pre-service and in-service teachers. Pre-service teachers have a variety of options open to them for training in environmental education. These include a single three-credit course (Foundations of Environmental Education), a 15-credit concentration in environmental education open to elementary education majors, a 24 credit minor in environmental education, or a 51-credit certifiable major in resource management/ environmental education. In-service teachers can also choose from a number of environmental education programs. These range from one day in-service training sessions to graduate degree programs in environmental education.

All pre-service and in-service teacher education programs in environmental education at UW-SP begin with a similar purpose. Irregardless of the program, there are common objectives. These objectives are defined as expected behavioral competencies to be achieved by the participating (pre-or in-service) teachers. The competencies identified are those

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which are believed to be necessary for a teacher to be an effective environmental educator (Wilke, Peyton and Hungerford, 1980). A complete description of these competency statements can be found in the Epilogue of this book. Prior to analyzing these competencies the reader should note that due to variations in duration, intensity, and goals for the various UW-SP in-service and pre-service environmental education teacher education programs there are also obvious variations in the number and type of competencies achieved during each program.

The competencies developed in UW-SP programs can be classified either as Foundational Competencies in Professional Education or Environmental Education Content Competencies. The competencies are achieved through the successful completion of a variety of courses offered primarily within the College of Natural Resources or School of Education. The courses taken obviously vary with the program chosen by the student (e.g., the concentration in environmental education, minor in environmental education., major in environmental education/resource management, or graduate program). A few of the courses common to most programs are described below.

Biology 205 - General Ecology 3 credits

Interrelationships of plants and animals; ecosystem concepts; organization and distribution of biotic communities; application of ecological principles to human affairs.

Natural Resources 300/500 - Foundations of Environmental Education 3 credits

Conceptual and philosophical basis for environmental education; analysis of environmental education instructional materials and strategies; development, implementation and evaluation of environmental education programs.

Natural Resources 370 - Introduction to Environmental Study 3 credits

Natural, social, and economic factors influencing the quality of man's environment; ecological relationships and principles and their relation to population growth, pollution, resource allocation and depletion, conservation, technology and urban and rural planning.

Natural Resources 375/575 - Environmental Field Studies 3 credits

Environmental and natural history study as a background to the use of the outdoors as teaching laboratory.

Natural Resources 376/576 - Environmental Education and Interpretation Practicum 4 credits

Practical experiences in environmental education and interpretation at selected off campus sites.

Natural Resources 478/678 - Community Environmental Issue Investigation
3 credits

Investigation and evaluation of environmental issues and problems; application of value clarification strategies, research methods, and citizenship action skills to selected community environmental issues.

A number of courses are common to more than one of the UW-SP teacher education programs in environmental education. These include:

Economics 204	Environmental Economics	3 credits
Philosophy 380	Environmental Ethics	3 credits
Political Science 304	Politics and the Environment	3 credits
Sociology 260	Population Problems	3 credits
History 366	Resource Development and Policy in the U.S.A.	3 credits
Natural Resources 474	Integrated Resource Management	3 credits

In addition to the courses described above, scores of additional courses which can aid in the development of environmental education competencies are offered at UW-SP.

The certifiable major at UW-SP in resource management/environmental education is analyzed in Tables I and II to illustrate where training in specific competencies is being achieved within that specific program.

In addition to the formal programs such as the major illustrated in Tables I and II, there are many other cooperative arrangements which contribute to student achievement of environmental education competencies. An excellent working relationship between faculty in the College of Natural Resources and the School of Education has assisted immeasurably in the development of pre-service and in-service programs. For the purpose of coordinating environmental education programs at UW-SP, the Central Wisconsin Environmental Station was developed in 1975. The Station serves as a center for environmental education programs and training. Since 1975 the Station's annual budget has grown from $18,000 to over $350,000. Through the Environmental Station, pre-service educators have the opportunity to plan, implement and evaluate environmental education programs for over 10,000 K-12 students annually. The CWES also provides opportunities and funding for graduate research in environmental education. Further, through the CWES, UW-SP faculty have procured numerous grants for in-service teacher training and environmental education curriculum dissemination. These grants have come primarily from either Title IV-C of the Elementary and Secondary Education Act, the National Science Foundation, or the U.S. Department of Education. During each of the past four years, at least 50 in-service teachers have completed extensive, eight-credit, teacher training programs in ecology and environmental education. Further, participating teachers

have served as environmental education instructors themselves while disseminating curricula such as Project Learning Tree materials or the 1049-page Central Wisconsin Environmental Education Resource Manual.

Although teacher training in environmental education at Stevens Point had its origin nearly 40 years ago there are still changes continually being made in UW-SP environmental education programs. Perhaps the most significant of the planned changes is the infusion of environmental education competencies into the entire elementary education major. Although elementary education majors can select a concentration in environmental education, few students are able to complete the concentration without extending their college experience by a semester. Preliminary plans are currently being developed to infuse environmental education competencies in courses within the existing major.

At the secondary level, discussions are being conducted to explore the possibility of infusing environmental education in the existing Broadfield majors in Natural Science and Social Science. Although a certifiable secondary education major in Natural Resources/Environmental Education already exists there are few job opportunities for graduates with that major. As we plan for the future at UW-SP we do not plan to eliminate the existing environmental education major, however, we do plan to place a greater emphasis on infusing environmental education competencies within other teaching majors.

An effort being coordinated by this writer is currently in progress to update and revise the Wisconsin Statutes which require "adequate preparation in the conservation of natural resources" for secondary science and social science teachers. Should the state Statutes be revised as suggested we would be aided in our effort to infuse environmental education into most teaching majors. The proposal to revise the existing statutes addresses the need for teacher competencies in environmental education. Further, the proposal would expand the requirement for environmental education preparation to include elementary and agriculture teachers in addition to science and social science teachers. If the proposed changes are passed, the next set of Case Studies of College Teacher Education Programs for Environmental Education could have a significantly greater number of Wisconsin higher education programs described.

Wilke, R. J., R. B. Peyton, and H. R. Hungerford, Strategies for the Training of Teachers in Environmental Education. (A UNESCO - UNEP Working Paper), Paris: UNESCO, 1980.

Table 1

Analysis of the UW-SP Resource Management/Environmental Education Major
(Foundational Competencies in Professional Education)

Environmental Education Competencies	Professional Education Courses								
Foundational Competencies in Professional Education	Introduction to Education	Science Methods	Principles of Education	Educational Psychology	Reading Methods	Foundations of Environmental Education	Practicum in Environmental Education	Student Teaching
Apply a knowledge of educational philosophy	C	B	C			A	A	A
Utilize current theories of moral reasoning		B		C		A	A	A
Utilize current theories of knowledge/attitude/ behavior relationships			B	C		A	A	A
Utilize accepted theories of learning		C	C	C	C	A	A	A
Apply theories of transfer of knowledge		C		C		A	A	A
Select and implement effective methodologies:								
Outdoor Education Methods		B				B	A	A
Affective Education Methods		B	B	B		A	A	A
Simulation Games		A				A	A	A
Case Study Methods		A				A	D	A
Community Resource Use		A				A	A	A
Autonomous student and/or group analysis of environmental issues		D		B		A	D	D

Table 1 cont.

Environmental Education Competencies	Professional Education Courses								
Foundational Competencies in Professional Education	Introduction to Education	Science Methods	Principles of Education	Educational Psychology	Reading Methods	Foundations of Environmental Education	Practicum in Environmental Education	Student Teaching	
Infuse environmental education curricula into disciplines	D	A	D		D	A	A	A	
Develop and use effective planning for instruction	B	A	C			A	A	A	
Effectively evaluate environmental education instructional outcomes	B	C	C			A	A	A	

A = Coursework contributes directly to this competency
B = Coursework contributes to the foundations required for this competency (e.g., at an introductory level)
C = Competency is developed, but in a non-environmental education context and/or should be examined more closely for infusion
D = Provides good opportunity for infusion this competency

Table II. Analysis of the UW-SP Resource Management/Environmental Education Major (Environmental Education Content Competencies)

Environmental Education Competencies	Selected Content Courses from the Major								
Environmental Education Content Competencies	Population Problems	General Ecology	Intro. to Natural Resources	Politics and the Environment	Integrated Resource Mgmt.	Environmental Economics	Foundations of EE	Practicum in EE	Community Environmental Issue Investigation
Apply ecological principles to the analysis of environmental issues	A	A	B		A				A
Apply ecological principles to predict ecological consequences of alternative solutions	B	A	B		A			D	A
Use ecological information in environmental problem solving		A	B		A			D	A
Apply ecological concepts in an educational context							A	A	
Make teachers aware of: How cultural activities influence the environment from an ecological perspective	B	A	B		A			A	A
How individual behaviors impact on the environment	A	A	B		A			A	A
A wide variety of issues and their implications	A	A	A		A			A	A
Alternative solutions for discrete problems and their implications	B		B	B	A	B		A	A
Need for environmental issue investigation and evaluation	D				D		B	D	A
Roles played by values and need for value clarification	B		D	D	D	D	A	D	A
Need for responsible citizenship action	B		D	A	D		A	A	A
Develop in teachers: Knowledge and skills needed to identify and investigate environmental issues	D	B		B	B	D	B	B	A
The ability to: Analyze issues and associated value perspectives	D			B	D	B	B	B	A

-continued-

Table II (continued)

Environmental Education Competencies	Selected Content Courses from the Major								
Environmental Education Content Competencies	Population Problems	General Ecology	Intro. to Natural Resources	Politics and the Environment	Integrated Resource Mgmt.	Environmental Economics	Foundations of EE	Practicum in EE	Community Environmental Issue Investigation
Identify alternative solutions for discrete issues and the associated value perspectives	D				D	B	A	A	A
Autonomously evaluate alternative solutions and associated values	D				D	B	B	B	A
Identify and clarify personal value positions related to discrete issues	D				D		A	A	A
Evaluate, clarify and change personal value positions in light of new information	D				D		B	B	A
Take positive environmental action to remediate problems									

A = Coursework contributes directly to this competency
B = Coursework contributes to the foundations required for this competency (e.g., at an introductory level)
C = Competency is developed, but in a non-environmental education context and/or should be examined more closely for infusing this competency
D = Provides good opportunity for infusing this competency

EPILOGUE:
A DIAGNOSIS AND PRESCRIPTION

R. Ben Peyton, Harold R. Hungerford, and Richard J. Wilke

Although quality programs do exist, teacher training programs in environmental education throughout the world remain relatively scarce or poorly developed. Even though there may be arguments to the contrary, sufficient data exist to support a statement concerning paucity and quality. Selim (1977) states, "Well developed and strongly supported curricula in environmental education for students training to be teachers do not pervade tertiary level institutions at this time; such efforts seem to be limited to individual exemplary programs dotted around the globe." It appears as though there is a critical world-wide shortage of teachers with the necessary competencies to effectively incorporate the environmental dimension in educational programs.

Although the Tbilisi Declaration (1978) recommends that the environmental dimension permeate all areas of the curriculum, this will not happen unless teachers develop the competencies to make it happen. Even in the United States, the focus on environmental education appears to be ecological,...or conservationist (Childress, 1978). This is a substantially different focus than the broader goals recommended in the Tbilisi Declaration (1978) or by the writers (1980). Childress (1978) reported a national survey of environmental education in which he noted that...

> ...objectives focused on helping students become knowledgeable about their environment and its associated problems, and developing an appreciation of environmental resources, were considered of more importance in a majority of programmes and projects than were those objectives focused on helping students actually solve environmental problems and develop problem solving skills. (p. 10)

Childress also concluded that teachers working in a given program or project had primary involvement in the content selection process.

Other studies also contribute evidence concerning teacher effectiveness in planning for and implementing environmental education programs. Champeau, et al. (1980), in a random survey of central Wisconsin K-12 teachers, determined that they did not have the training or skills necessary to implement programs involving ecological foundations, issue awareness, or environmental issue investigation, evaluation, or remediation. In a similar vein, Peyton and Hungerford (1980) surveyed 225 preservice and inservice elementary teachers from three midwestern states to assess their environmental action competencies. A majority of the teachers perceived they lacked the necessary skills to take effective environmental action themselves. Further, they felt unprepared to develop teaching materials dealing with environmental action.

These findings, and others, support the inference that at least part of the responsibility for lack of effective environmental education

programs, lies with the teacher education institutions. The authors submit that tertiary institutions, by and large, are doing a poor job of preparing teachers to plan for and teach effective environmental education programs.

It is the intent of this writing to pose a set of environmental education teacher competencies as a prescription for environmental education curriculum development in teacher education institutions. The authors have suggested strategies for developing and implementing environmental education curricula for teacher training programs elsewhere (Wilke, et al., 1980). Space permits only a reference to some sort of infusion process as holding the greatest potential for change in teacher education. Acknowledging that numerous intimately-related topics are being purposefully omitted from this document, the fact remains that some sort of goals statement should exist for professionals preparing to develop and implement teacher education programs for environmental education.

The goals prescription that follows is a synthesis of foundational competencies generic to professional education and specific competencies for environmental education. Generic foundational competencies are described widely in the literature but the specific competencies of environmental education are a direct consequence of a careful analysis of the goals of environmental education prescribed in the Tbilisi Declaration (1978), Strategies for the Training of Teachers in Environmental Education (Wilke, et al., 1980), and Goals for Curriculum Development in Environmental Education (Hungerford, et al., 1980). Hopefully, this prescription of competencies will help in advancing program development in professional environmental education and assist in remediating problems identified by Childress (1978) Champeau, et al. (1980), and others.

The initial steps in designing training programs at either pre- or inservice levels must include a definition of the desired teacher product. The most functional way to define the product is in the form of expected behavioral competencies - associated knowledge, skills, and attitudes which are necessary in order to effectively teach environmental education programs. The emphasis of environmental education programs varies with grade level and disciplines and therefore the degree of competency required of teachers will vary with assignment. A secondary social studies teacher, for example, may require more expertise in the use of case studies as investigative models than is required by a primary level teacher. However, the need remains for all effective environmental education teachers to have some degree of competency in each of the areas described below.

These areas of competency are suggested as guidelines for planning or evaluating an environmental education teacher training program. The competencies must be further refined into more specific statements if they are to be functional in the selection of topics, teaching strategies, or evaluation schemes for the training program. Narratives which are intended to exemplify and facilitate the refinement process accompany many of the competency area statements.

Foundation Competencies in Professional Education

The effective environmental education teacher should be able to...

(1)...*apply a knowledge of educational philosophy to the selection (and/or development) of curricular programs and strategies to achieve both general education and environmental education goals.*
(It is important that all educators be aware of the philosophical basis for education in their own society. Environmental education goals and methods should be evaluated in light of such philosophies as Experimentalism or Reconstructionism. Many accepted goals of general education supported by such philosophies are entirely consistent with environmental education goals. General education materials and methods may sometimes need to be merely "environmentalized" to achieve the goals of each.)

(2)...*utilize current theories of moral reasoning in selecting, developing and/or implementing environmental education curricula in order to effectively achieve accepted goals of environmental education with selected receiver groups.*
(Included in this category of "moral reasoning" are not only theories of moral development, but theories of valuing processes as well. Environmental education teachers should be competent to assess the developmental readiness of receivers when dealing with attitudes and processes in the affective domain. Teachers should be able to use strategies which allow receivers to recognize the role of values in environmental decision making, clarify value positions, and understand the valuing process).

(3)...*utilize current theories of knowledge/attitude/behavior relationships in selecting, developing and/or implementing a balanced curriculum which maximizes the probability of desired behavior changes in receivers.*
(Environmental educators often assume linear relationships among ecological knowledge, positive environmental attitudes, and environmentally ethical behavior. Current research indicates that such may not be the case. Many variables impinge on environmentally ethical behaviors, including various categories of knowledge (e.g., ecological knowledge vs. trade-off costs), experiences, and locus of control (internal or external). A balanced and syntactically sound curriculum is necessary to achieve environmental education goals.)

(4)...*utilize accepted learning theory (e.g., Piaget, Bruner, Gagne) in selecting, developing, and/or implementing curricular materials and teaching strategies to effectively achieve environmental education goals with selected receiver groups.*
(The nature of many environmental education goals is problem solving. Learning theory has much to offer in guiding the selection of materials and strategies to develop problem solving abilities. Selection of appropriate environmental education materials and strategies for specific receiver age levels may be effective when theories of learning development are considered.

A pragmatic approach to this body of knowledge would do much to increase the effectiveness of environmental education teachers.

(5)...*teach for the transfer of learning to insure that learned knowledge, attitudes, and cognitive skills will be transferred to lifestyle decision-making by receivers.*
(The ultimate goal of environmental education is to produce environmentally literate citizens who are willing and capable of taking positive environmental actions in their lives. Too often, educators fail to teach for the transfer of knowledge, attitudes and cognitive processes learned in the classroom, to use in problem solving in students' lives.)

(6)...*select and implement effective instructional methodologies to achieve environmental education goals appropriate for desired cognitive and affective outcomes, receiver characteristics, and available facilities (e.g., time, money, personnel):*

(A) outdoor education methods.
(B) affective education methods (e.g., values clarification, Bank's inquiry model, moral dilemma model).
(C) simulation games (including role playing).
(D) case study methods.
(E) community resource use (ecological, issue-related, human resources).
(F) methods of autonomous student and/or group investigation and evaluation of environmental issues.
(G) methods for effectively handling controversial environmental issues.

...use effective means of planning for instruction.

(7)...*effectively infuse environmental education curricula and methods into all appropriate disciplines.*

(8)...*effectively evaluate environmental education instructional outcomes in cognitive, affective, and behavioral domains.*

Competencies in Environmental Education Content

Level I: Ecological Foundations

The effective environmental education teacher should be able to...

(9)...*apply a knowledge of ecological principles to the analysis of environmental issues and identify key ecological principles involved.*

(10)...*apply a knowledge of ecological principles to predict the ecological consequences of alternative solutions to environmental problems.*

(11)...*be sufficiently literate in ecology to identify, select,*

and interpret appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental problems.

(12)...*communicate the major concepts in ecology and their implications for environmental quality.*
A partial listing of ecological concepts is presented below to provide examples of how this competency level should be further operationalized. The criteria for further development and selection should include the usefulness of the ecological concept in understanding man's dependence on a stable, productive ecosystem for survival, and how man's activities impact on ecosystems.

A. Individuals, populations, communities, and ecosystems represent legitimate organizational levels in nature which must use homeostatic mechanisms to cope with the laws of the universe (e.g., laws of thermodynamics) and the forces of change in the environment, in order to survive.
B. Energy flows through and matter must recycle in ecosystems.
C. Succession is the process of ecosystems changing with time, generally from a less complex stage to a more complex and mature stage.
D. The population as an organizational level is the basic unit of the ecosystem. Each population occupies a specific functional niche which "fits" into the organization of the ecosystem (e.g., as part of the energy flow and biogeochemical cycles).

Level II: Conceptual Awareness

The effective environmental education teacher should be able to select, develop and/or implement curricular materials which will make receivers aware of...

(13)...*how man's cultural activities (e.g., religious, economic, political, social, etc.) influence the environment from an ecological perspective.*

(14)...*how individual behaviors impact on the environment from an ecological perspective.*

(15)...*a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues.*

(16)...*the viable alternative solutions available for remediating discrete environmental issues and the ecological and cultural implications of these alternative solutions.*

(17)...*the need for environmental issues investigation and evaluation as a prerequisite to sound decision-making.*

(18)...*the roles played by differing human values in environmental*

issues and the need for personal values clarification as an integral part of environmental decision-making.

(19)...*the need for responsible citizenship action (e.g., persuasion, consumerism, legal action, political action, ecomanagement) in the remediation of environmental issues.*

Level III: Investigation and Evaluation

The effective environmental education teacher should be competent to investigate environmental issues and evaluate alternative solutions, and to develop, select and/or implement curricular materials and strategies which will develop similar competencies in receivers, including...

(20)...*the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information and to synthesize the data gathered).*

(21)...*the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.*

(22)...*the ability to identify alternatives solutions for discrete issues and the value perspectives associated with these solutions.*

(23)...*the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.*

(24)...*the ability to identify their own value positions related to discrete environmental issues and their associated solutions.*

(25)...*the ability to evaluate, clarify, and change their own value positions in light of new information.*

Level IV: Environmental Action Skills

The effective environmental education teacher should be competent to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of environment, and to prepare, select, and/or implement curricular materials and strategies which develop similar competencies in receivers to take individual or group action when appropriate (i.e., persuasion, consumerism, political action, legal action, ecomanagement, or combinations of these action categories).

It is difficult to recommend a general training program model to achieve environmental education competencies in educators. This is due in part to the diversity of designs and constraints which must be considered in existing programs. Generally, preservice training programs in environmental education may involve three approaches: (1) a specific course in environmental education methods; (2) infusion of environmental

education methods and foundational components into existing program courses; and (3) addition of courses in the curriculum which deal with foundational components. Ideally, a preservice training program would incorporate all three of these approaches. However, constraints imposed by time, facilities and instructor expertise may necessitate otherwise. The addition of an environmental education methods course or other foundational courses into an already crowded teacher training curriculum may prove impractical. (For a thorough description of preservice as well as inservice environmental education teacher education models the reader may wish to consult Wilke, et al.)

Certainly, enormous gains could be made in environmental education if the philosophy, content, and spirit of environmental education were to be infused into the framework of existing teacher education programs. Further, in the opinion of the writers, such an infusion could take place without compromising either the quality of goals or existing courses and programs. In some instances, the quality of programs could even be upgraded if attention was focused on the higher level processes involved in environmental education, e.g. issue investigation and evaluation.

The very nature of environmental education calls upon a plethora of common cultural skills and knowledge, a variety of generic investigation skills, and a set of affective attributes known to many areas of human endeavor. The use of basic research skills, for example, is no more the stepchild of environmental education than it is of numerous other fields. Political, legal, and social processes involved in environmental issue solution are the very same ones involved in other areas of human endeavor. Values clarification strategies and rational decision making in environmental education are merely content specific applications of these generic processes. The citizen environmental action skills of persuasion, consumerism and others are simply sociocultural action modes applied to environmental issues. Very little in the realm of environmental education with respect to cognitive skills, action skills, or affective processes belongs solely to environmental education. This fact alone makes the potential for infusing environmental content into teacher education programs almost unlimited.

One can envision a teacher education program with environmental content infused into general education courses such as earth science, biology, chemistry, economics, social problems, music appreciation, religious history, design, basic mathematics, communications, literature, and others. The same holds true for course work specifically designed for teacher education. Environmental content could be infused into a general classroom methods course, the student teaching experience, and special methods courses (e.g., science, math, social studies, language arts, music, industrial arts, and home economics). All of these courses/ experiences have elements in them which are eminently appropriate for the environmental content infusion process.

That which is specific to the arena of environmental education is the content related to environmental issues per se (e.g., pollution, population problems, endangered species, wetlands management, etc.). Thus, environmental education is, in reality, a body of ever-changing

knowledge and situations to which the very generic processes and affective strategies are applied. Learners are simply applying elements such as problem solving and values clarification to environmental content. These information processing and attitude generating procedures could well be learned within the context of environmental education itself, or they could be learned in some other context. If learned in association with some other content, it follows that receivers must be taught to transfer these attributes to the environmental dimension. This critical step would increase the development of higher order processes within any one of a number of traditional content areas and still provide for enlightened application to issues of environmental concern.

However designed, an effective teacher education program will develop the knowledge, skills, and attitudes identified herein. These educational attributes are, indeed, those which will allow for the development of environmentally appropriate behaviors and responsible citizen participation within receiver populations. This is, in reality, the education goal toward which all other environmental education goals and objectives are focused. Certainly, the environmental education community can ask no more. More importantly, it should ask no less!

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